Tooth Preparation

By

Dr. Tamer A. Hamza

Definition



A procedure in which we remove tooth structure and reshape the tooth in order to receive a properly seated restoration





Principle of tooth Reduction

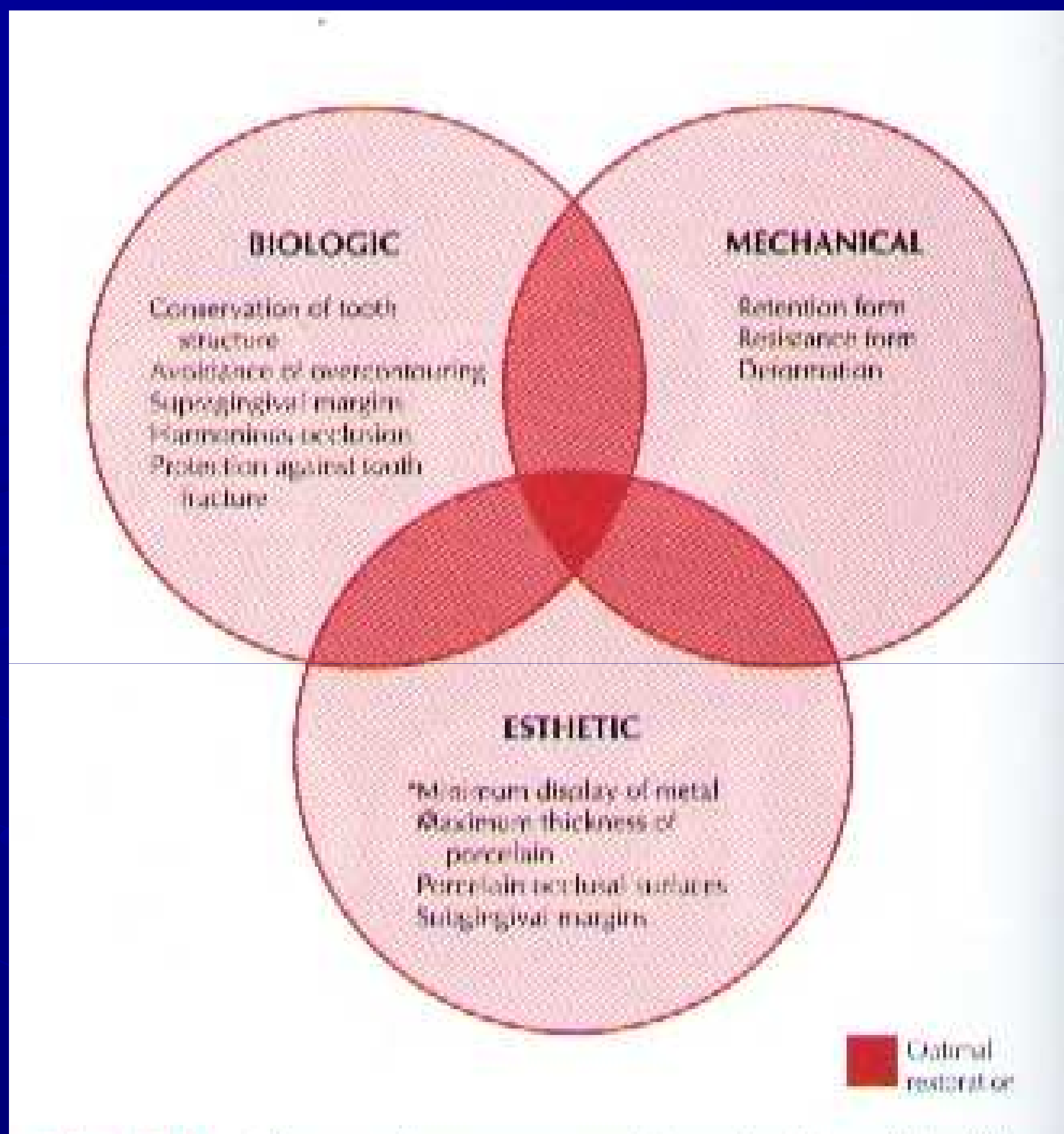


Fig. 7-1. The optimum restoration should satisfy biologic, mechanical, and esthetic requirements.

Biological considerations

1- Prevention of damage during tooth preparation

A- Adjacent tooth







B- Soft tissue

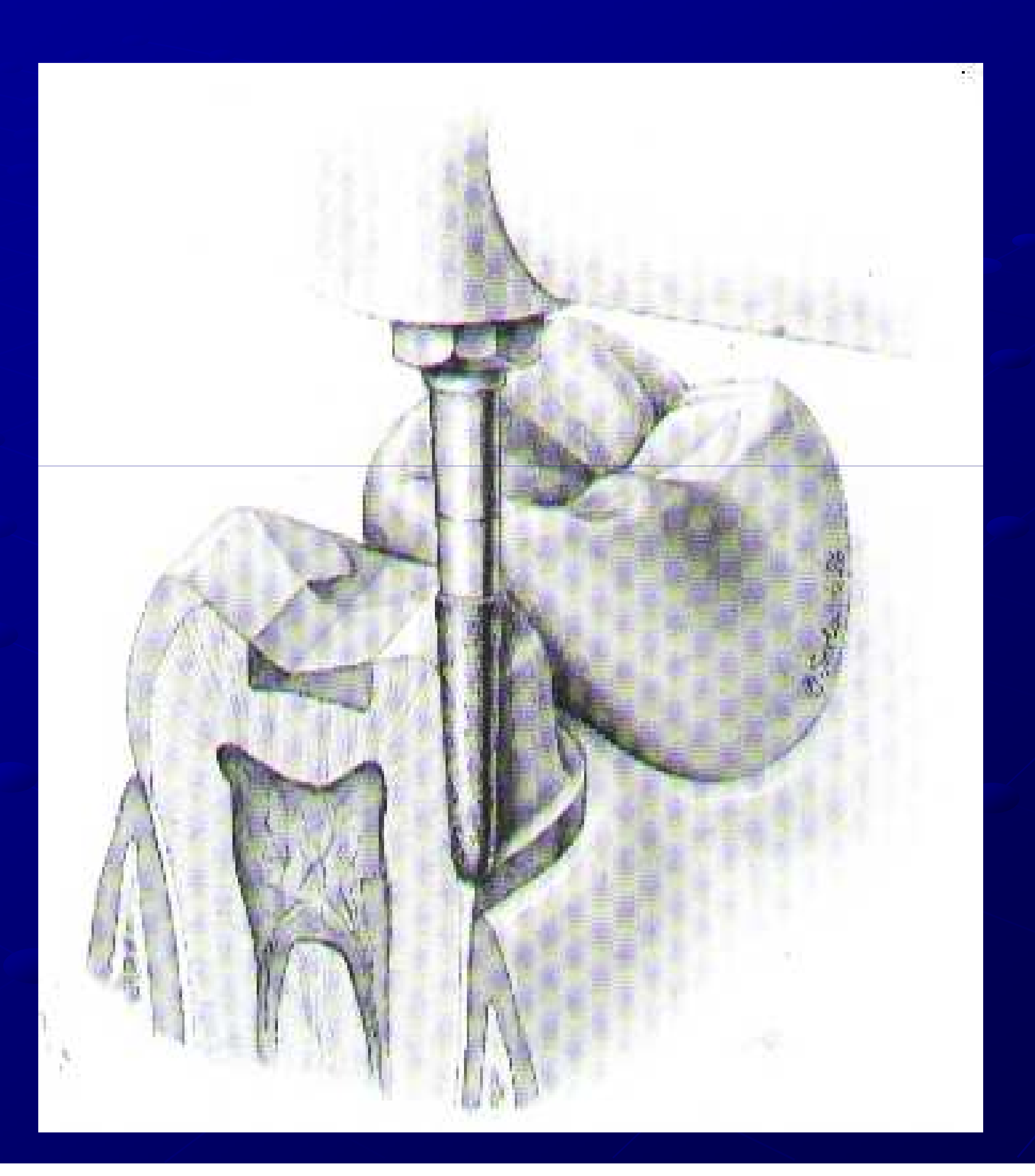


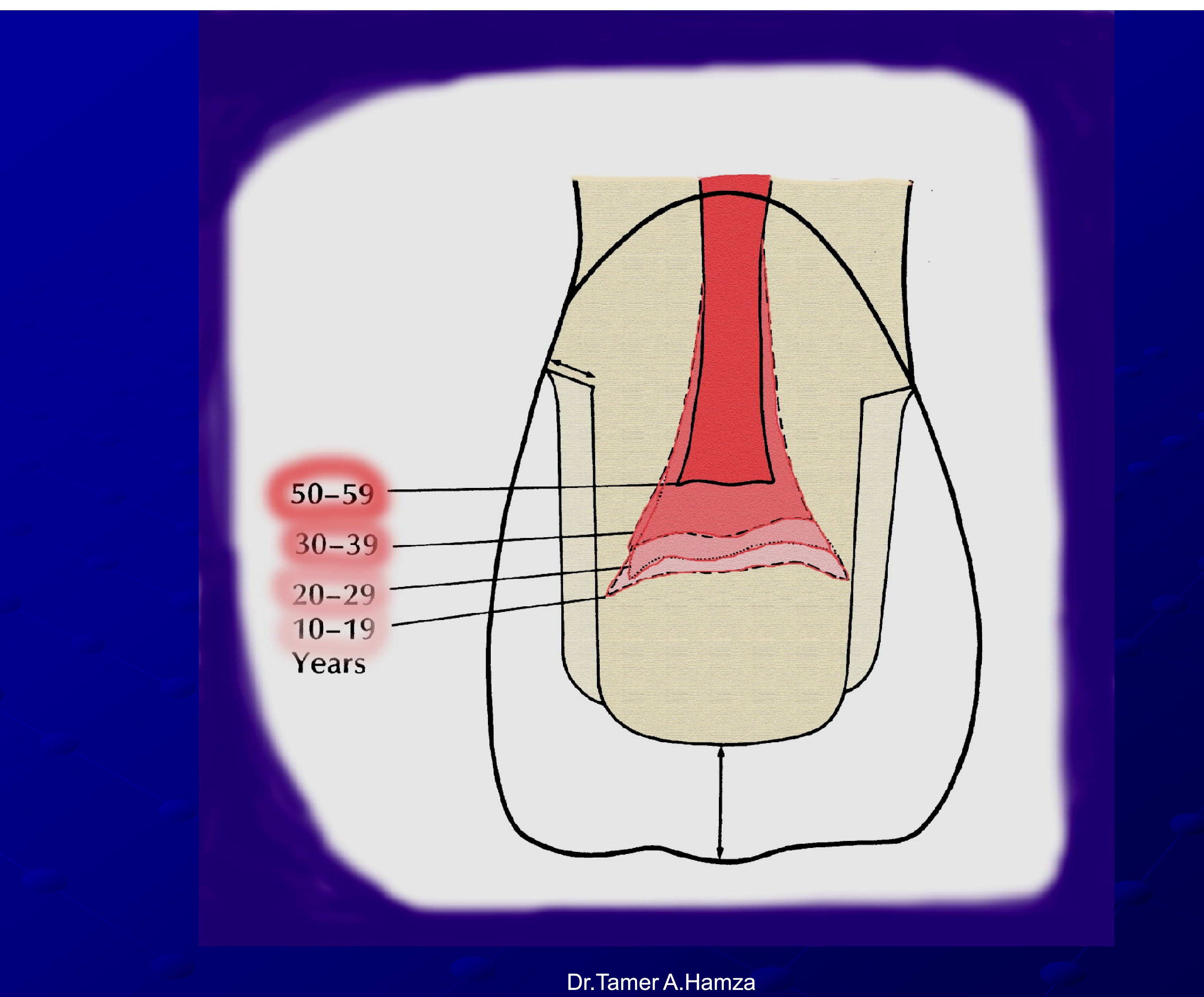



A



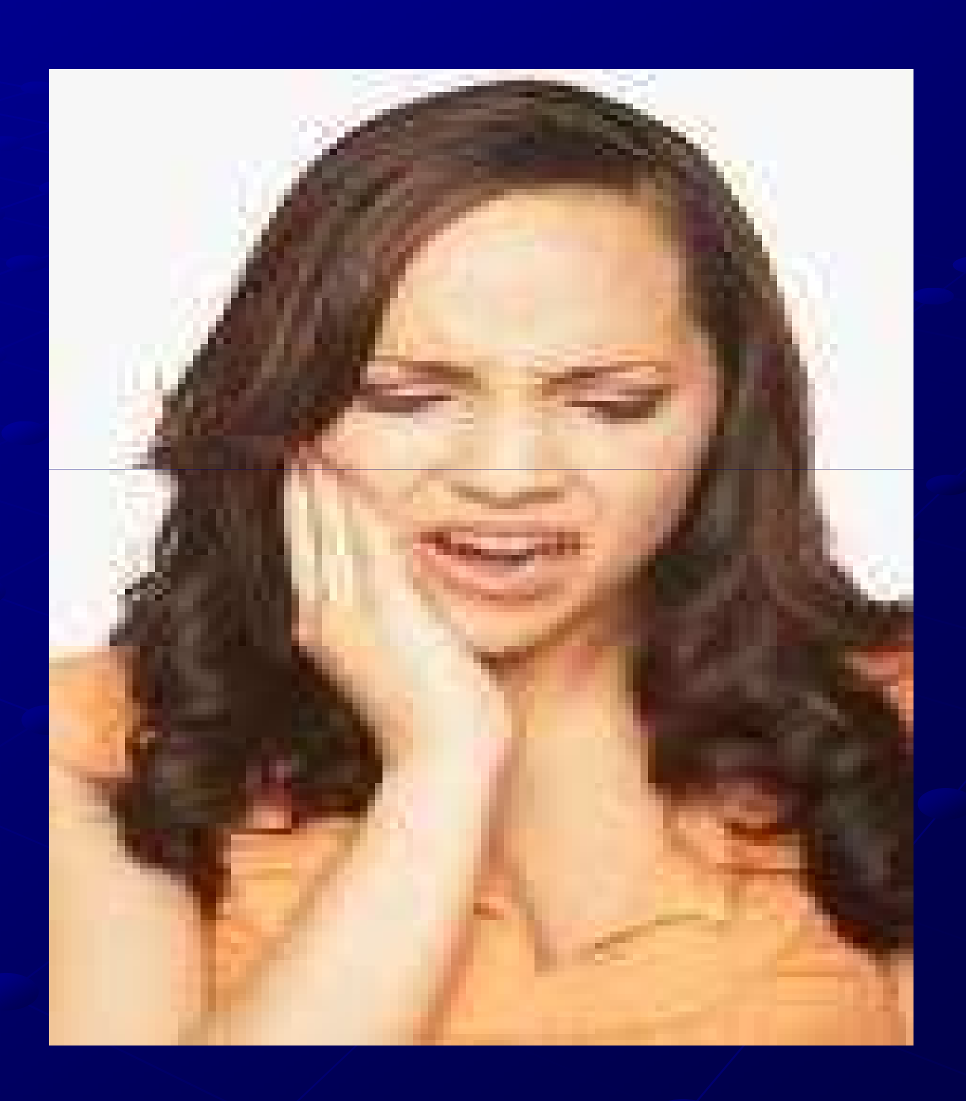
C-Pulp




50–59
30–39
20–29
10–19
Years

Causes of pulpal injury

- Thermal injury
- Chemical injury
- Bacterial injury



How to prevent pulp injury

- Use of water coolant
- Be conservative as much as u can
- Removal of all carious material
- Prepare the tooth to receive a fully seated restoration to prevent further decay
- Avoid use of chemical agents which affect the pulp that also include the cement we use

2- Conservation of tooth structure

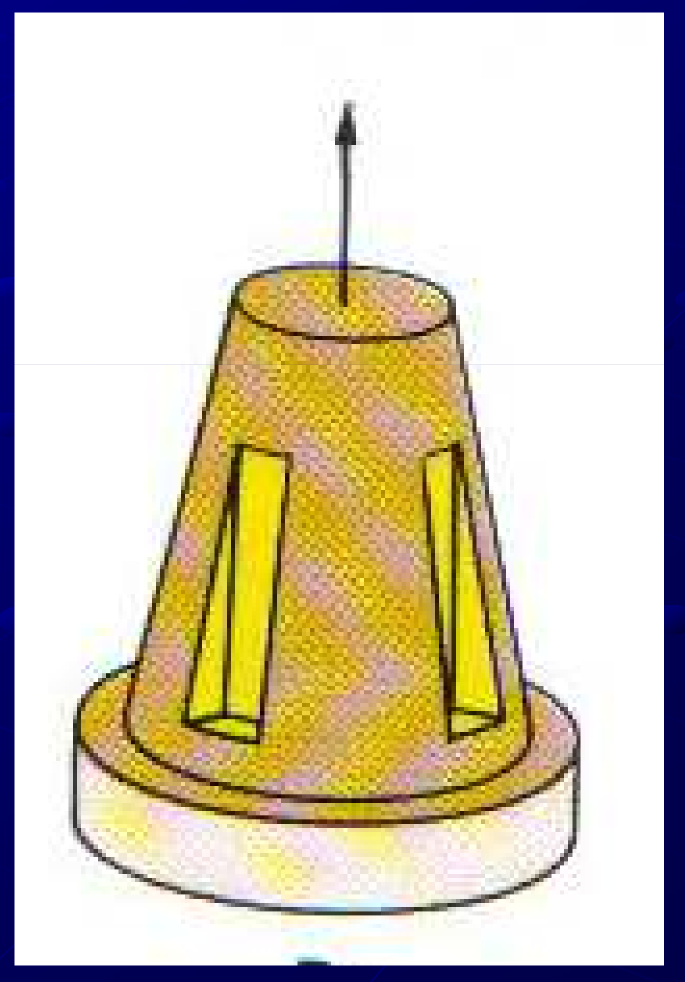
1-Use of partial coverage rater than complete coverage

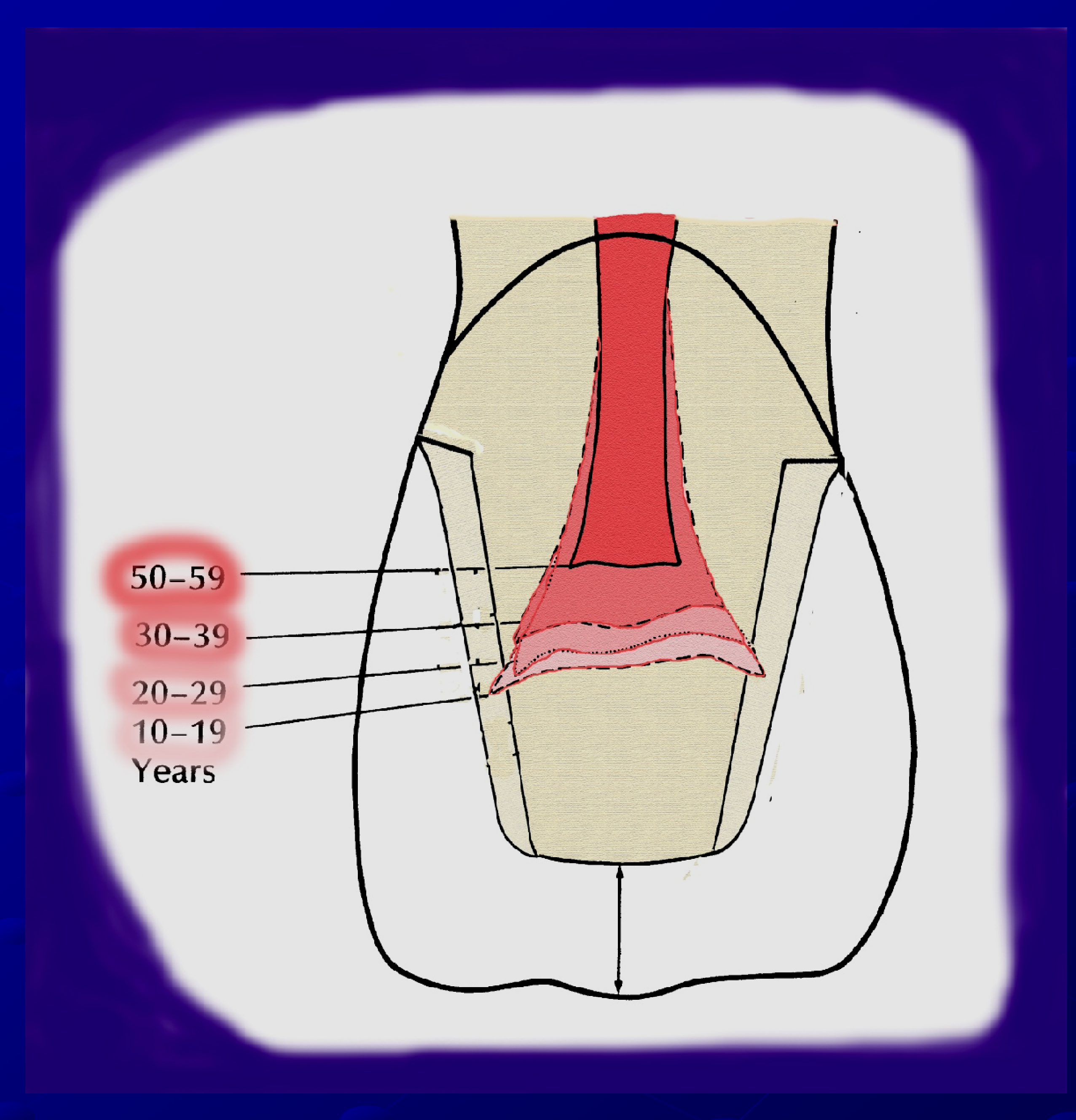




2- Preparation of teeth with minimum taper



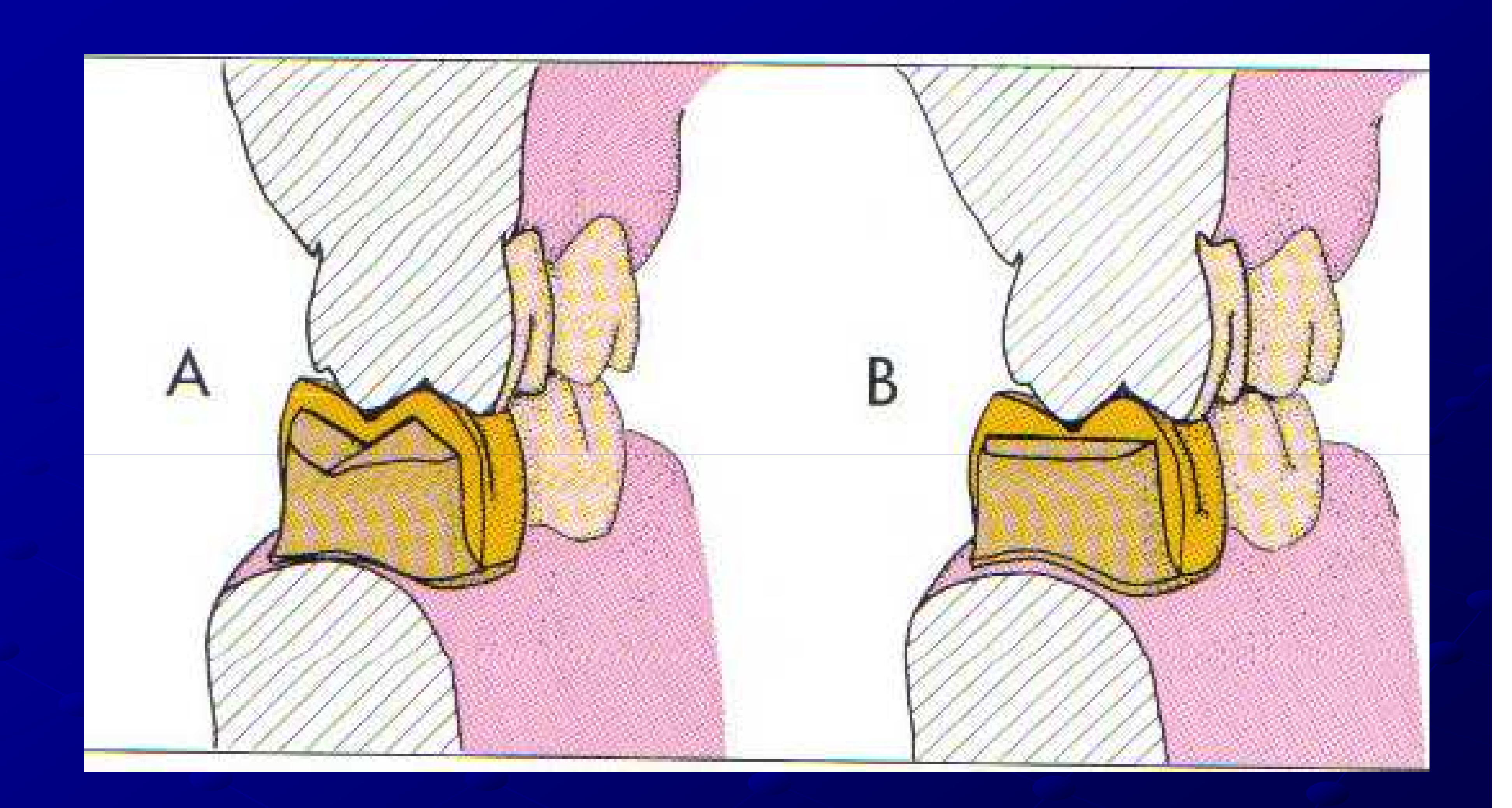




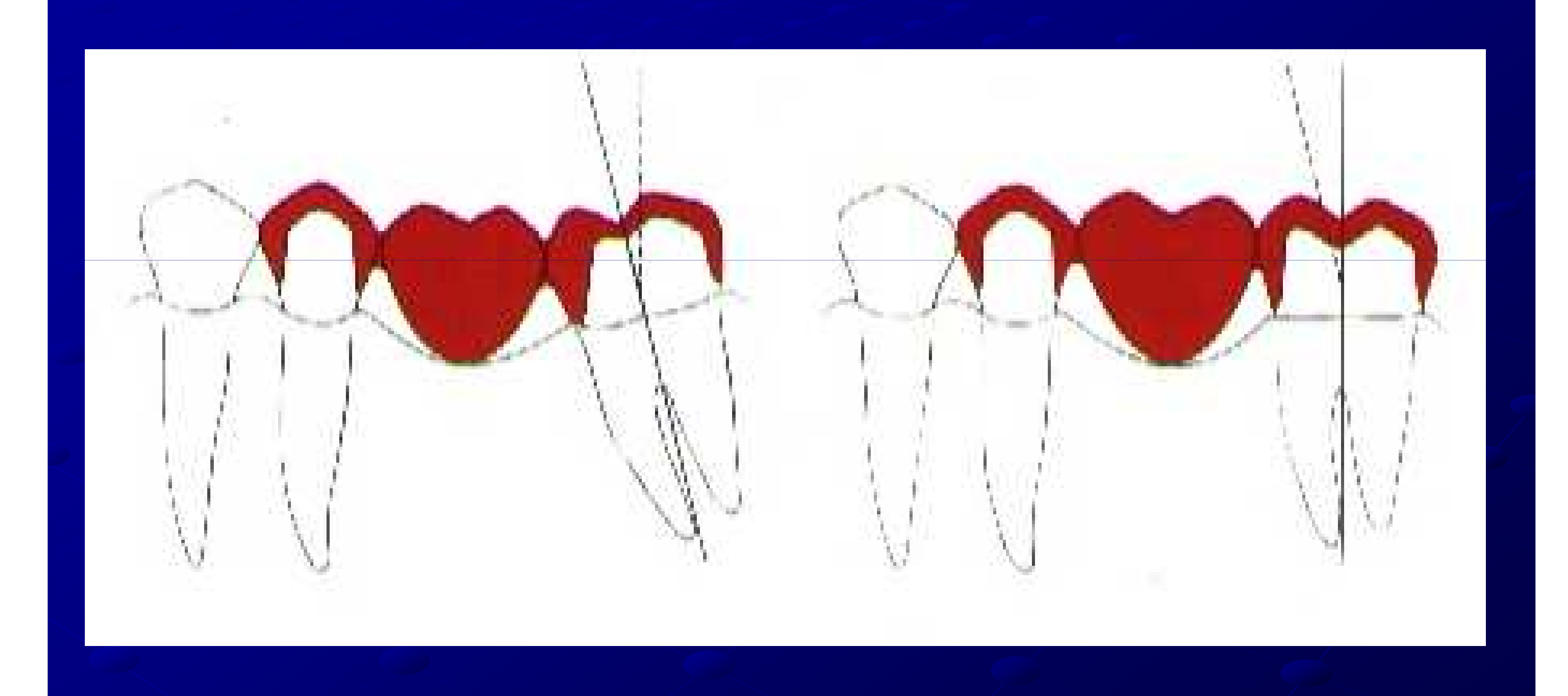
50–59
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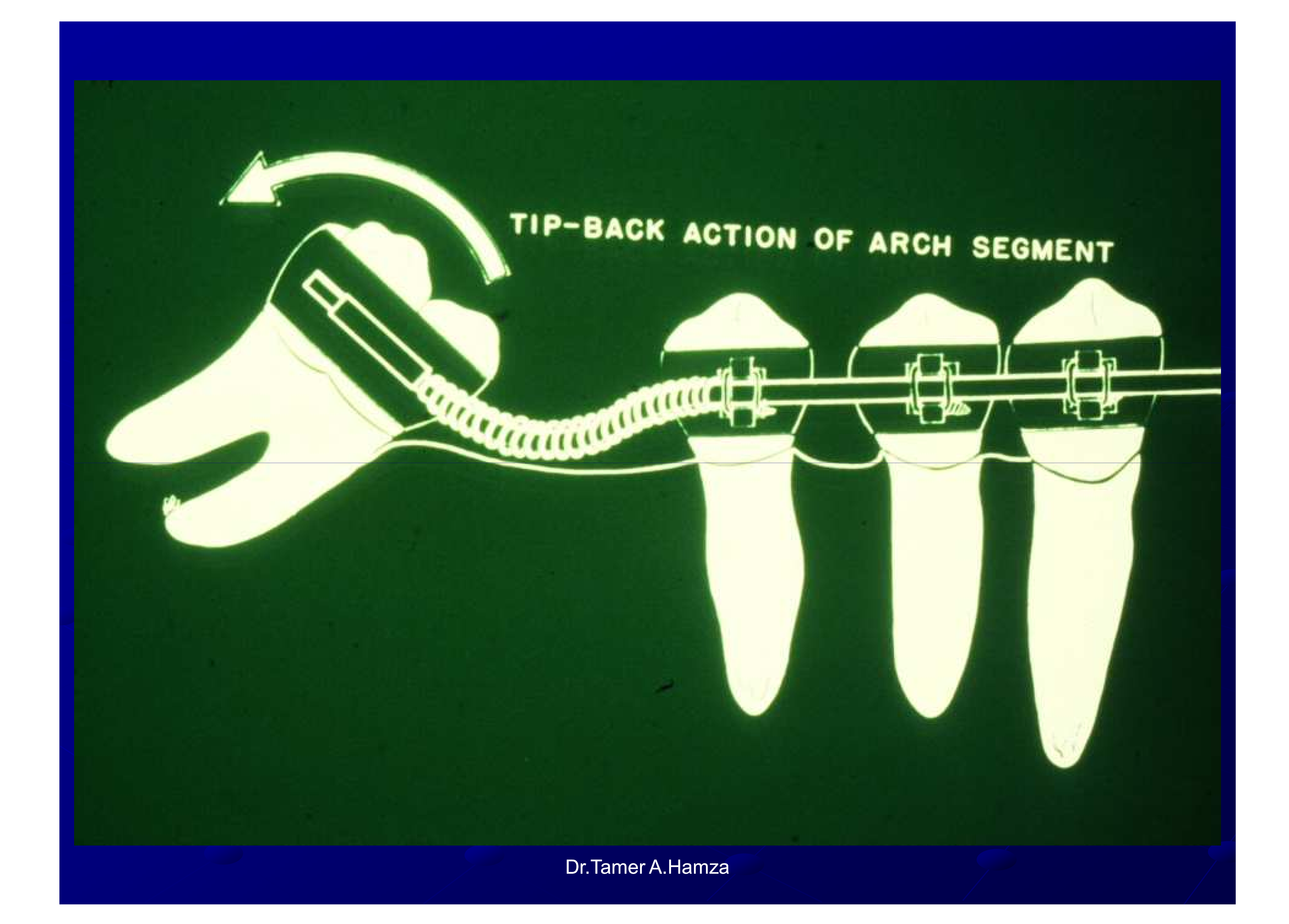
3-Occlusal reduction follow the anatomy



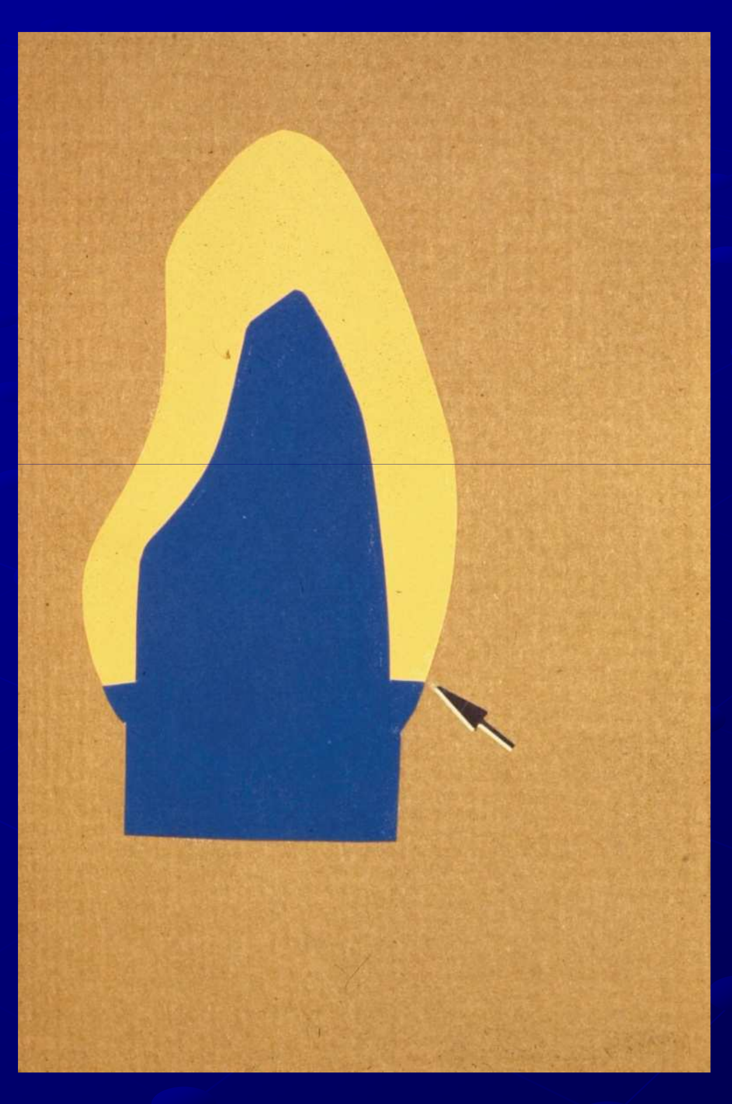

A
B

4-Even and adequate axial tooth reduction

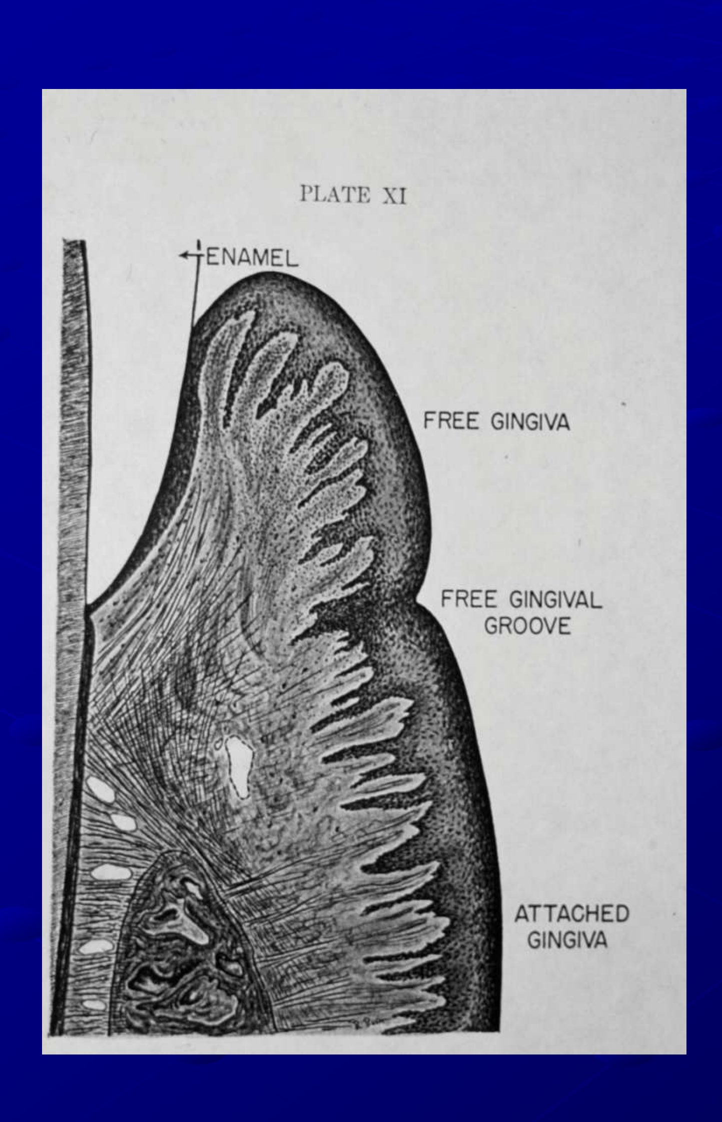


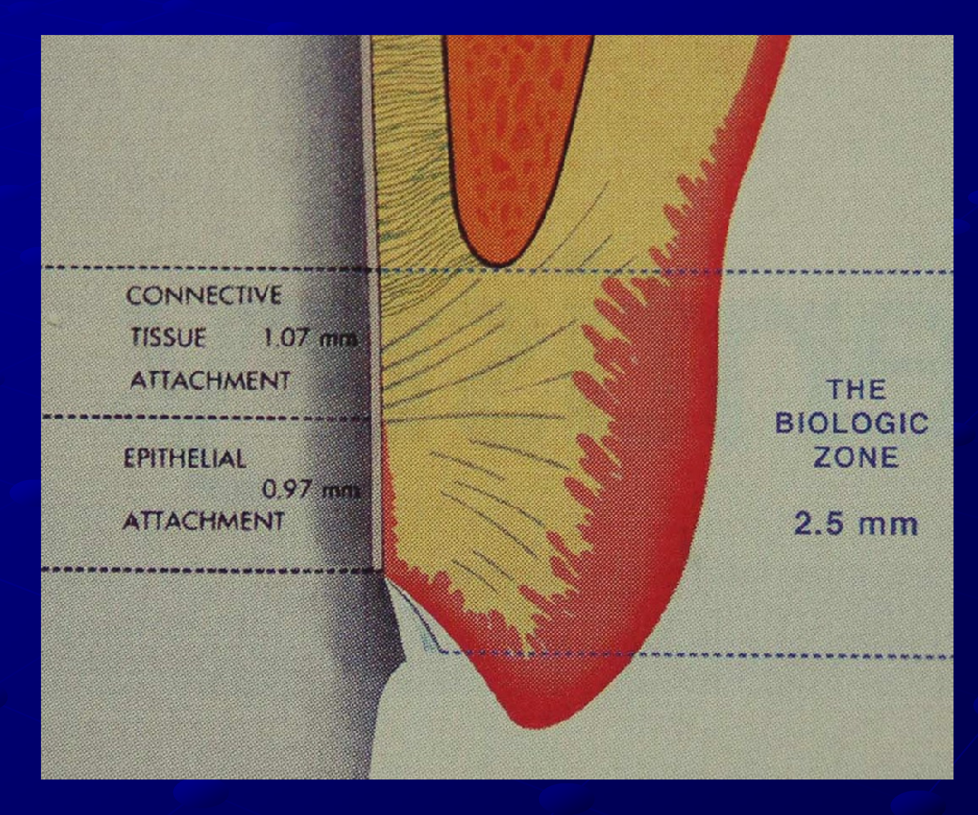

TIP-BACK ACTION OF ARCH SEGMENT

5-use of conservative margin



6- Avoid unnecessary apical extension of the preparation

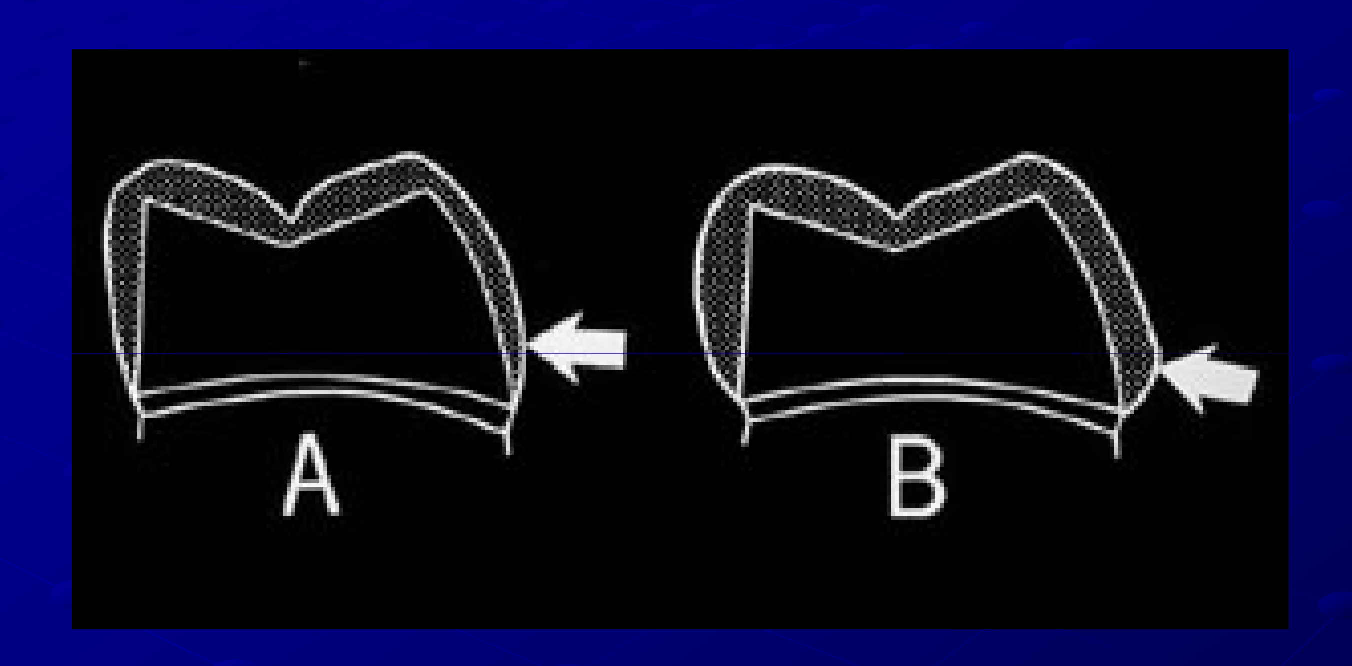




- What is the biological zone

3- Considerations affecting future health

1- Axial reduction



Gingival inflammation is associated with over contouring



Dr.Tamer A.Hamza

2-Margin location

- Supra gingival advantage :

1-easily prepared
2-more easily kept clean
3-impression easy made
4-easily evaluated during recall appointments



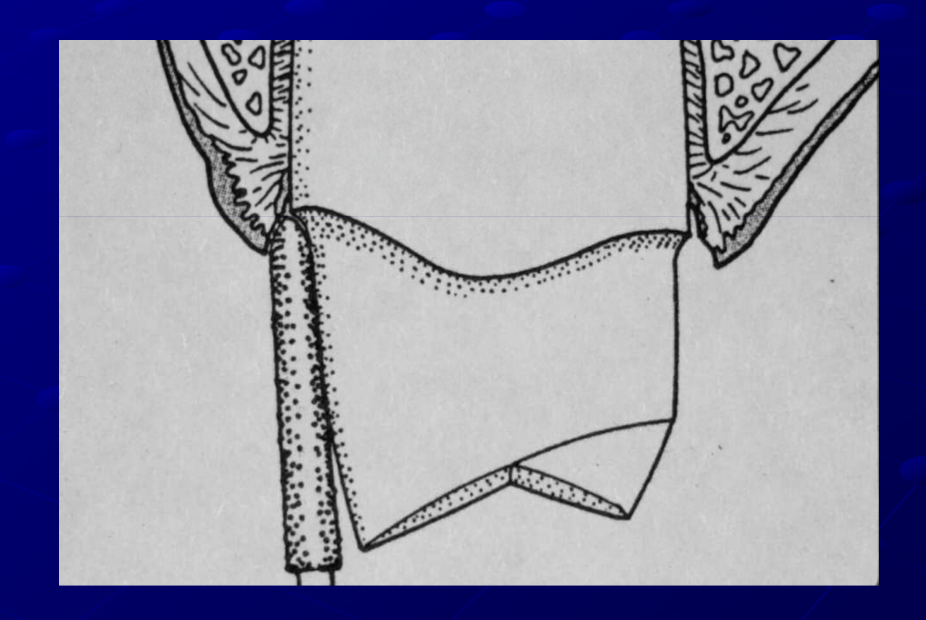
Subgingival

1-Cervical dental carious

2-Esthatics

3- Short clinical crown

4- The proximal contact extend to the gingival crest



Biological width

CONNECTIVE
TISSUE 1.07 mm
ATTACHMENT

EPITHELIAL
0.97 mm
ATTACHMENT

THE
BIOLOGIC
ZONE
2.5 mm

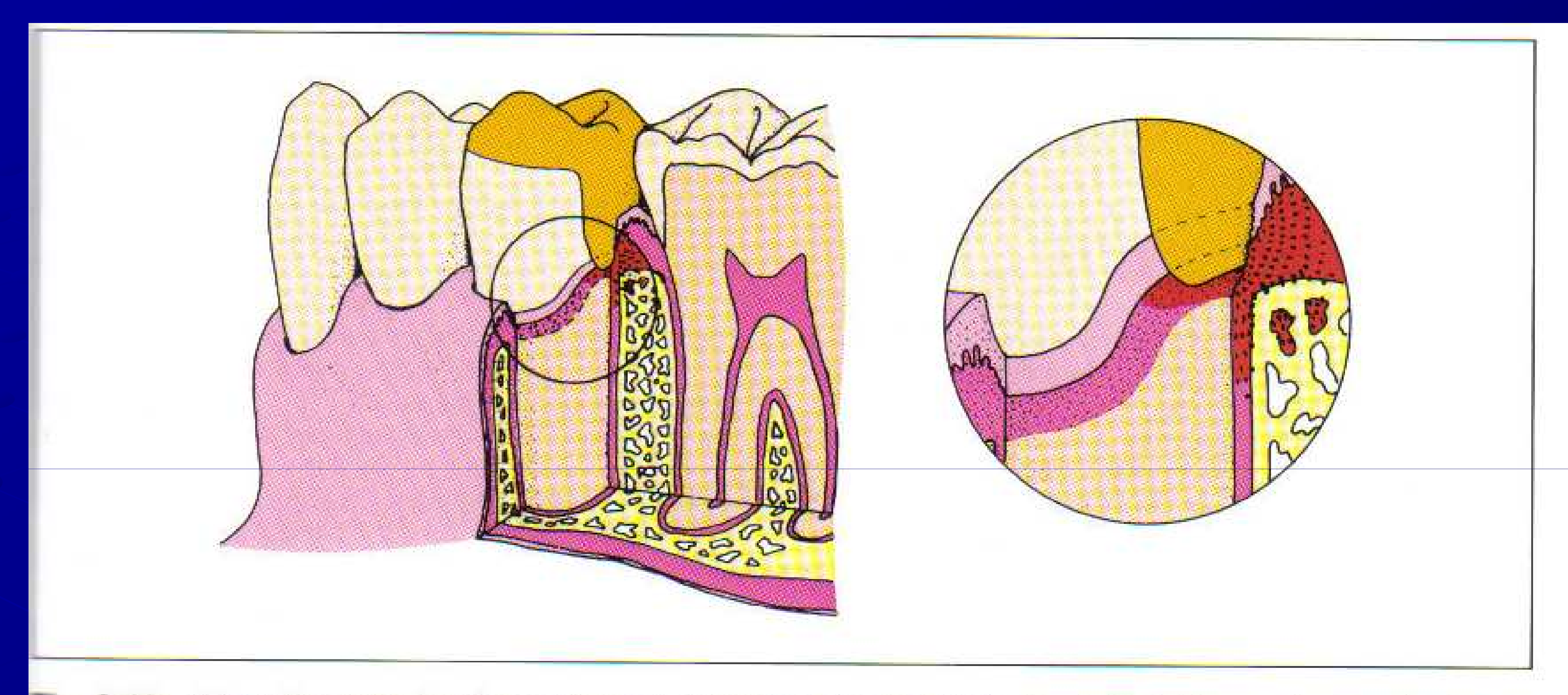
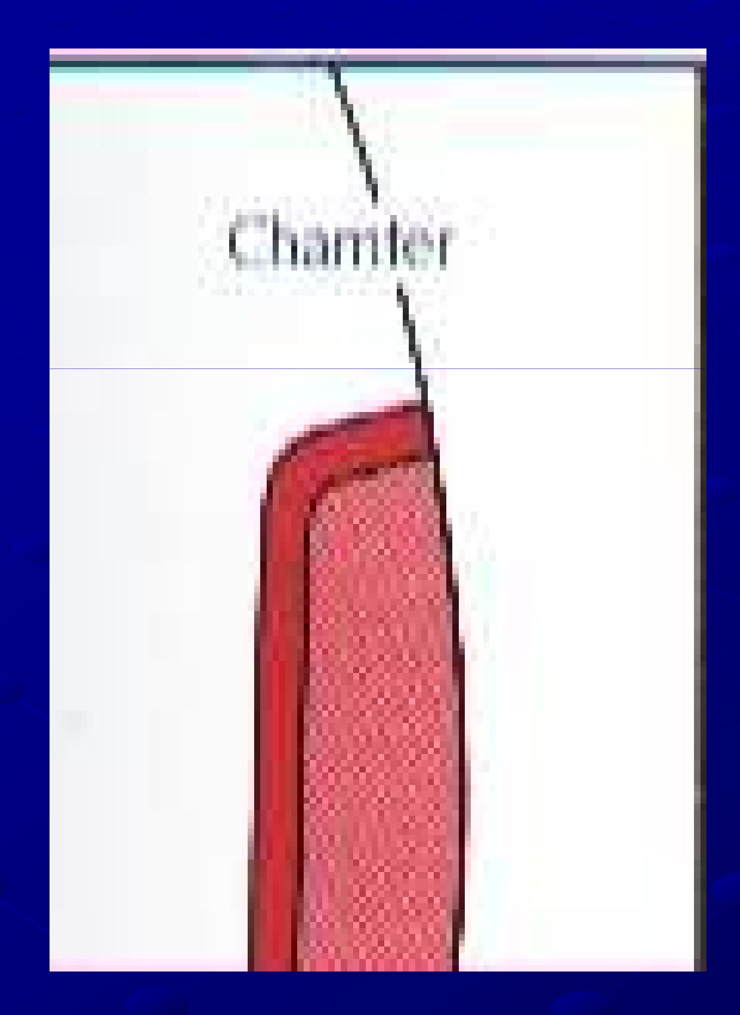
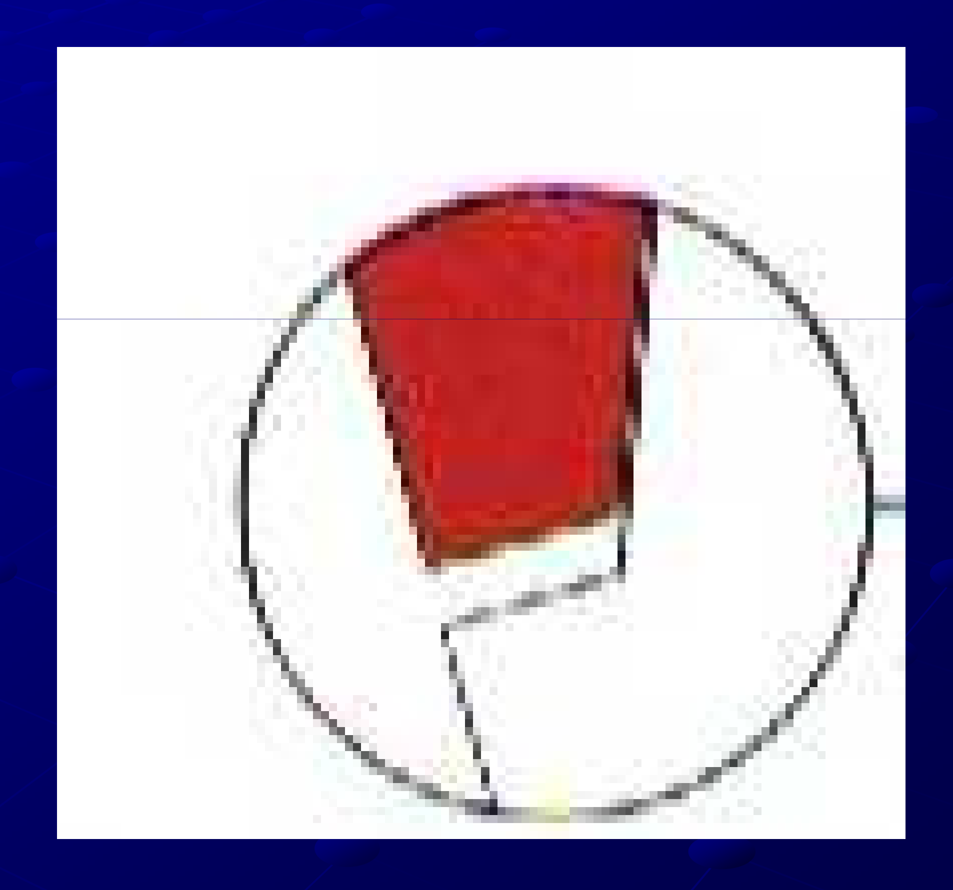


Fig. 2-13 When the margin of a restoration intrudes into the biologic width, inflammation and osteoclastic activity are stimulated.

3-Margin adaptation



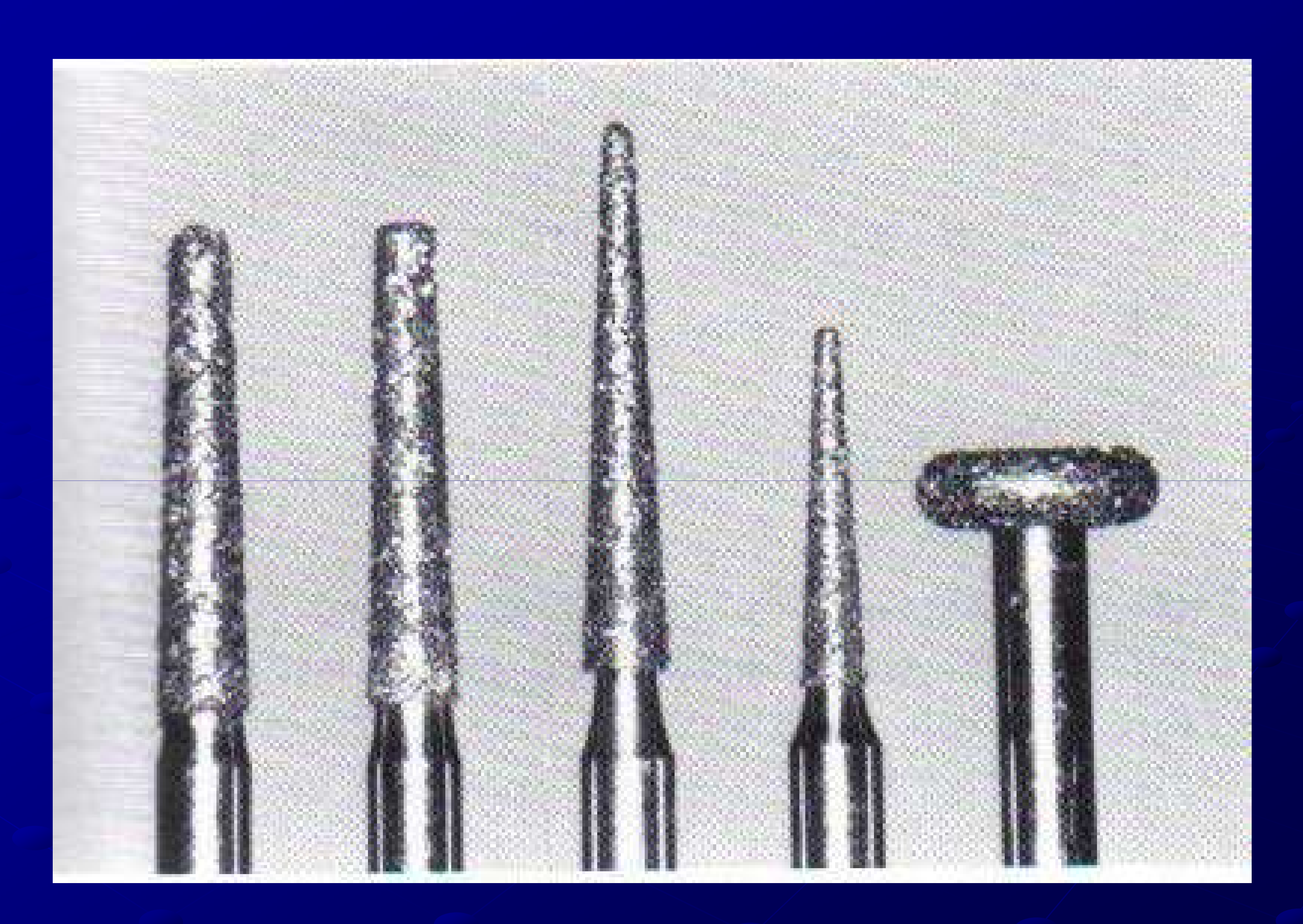

Chamfer





4-Margin geometry (Finish line)





- Ending of the tooth preparation should be terminate in a define position

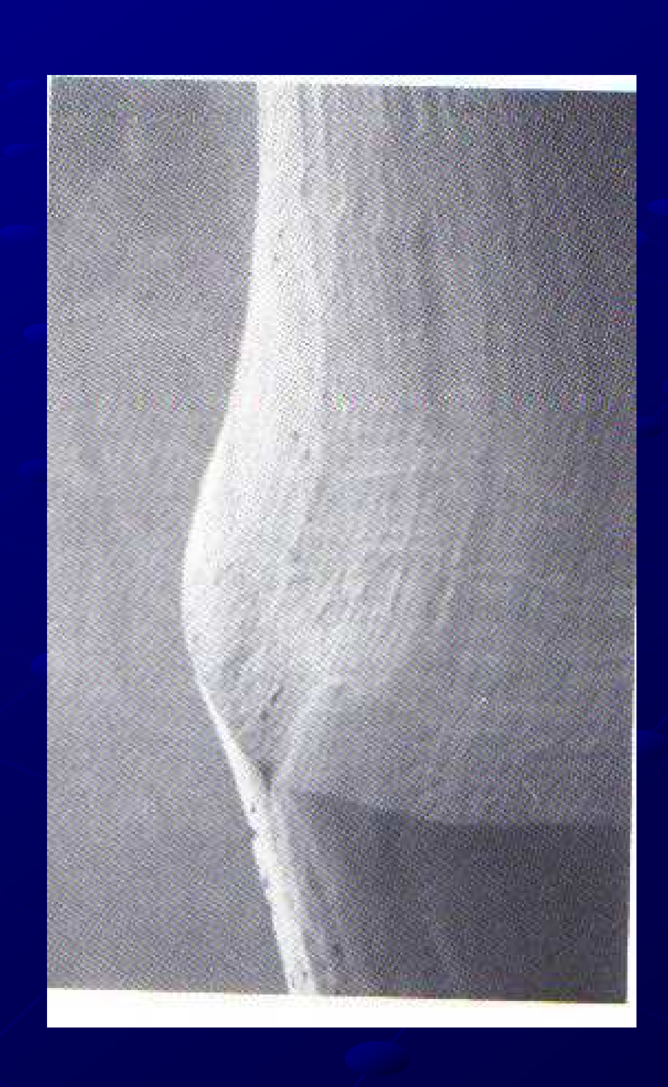




Finish line configuration

- **1-Feather edge** (shoulderless preparation) (indefinite)
- It is not recommended now

  used with swaged crowns



Advantage : conservative

Disadvantage :no sufficient bulk

2-Chisel (knife edge)

used on 1- tilted tooth

2-lingual surface of molars

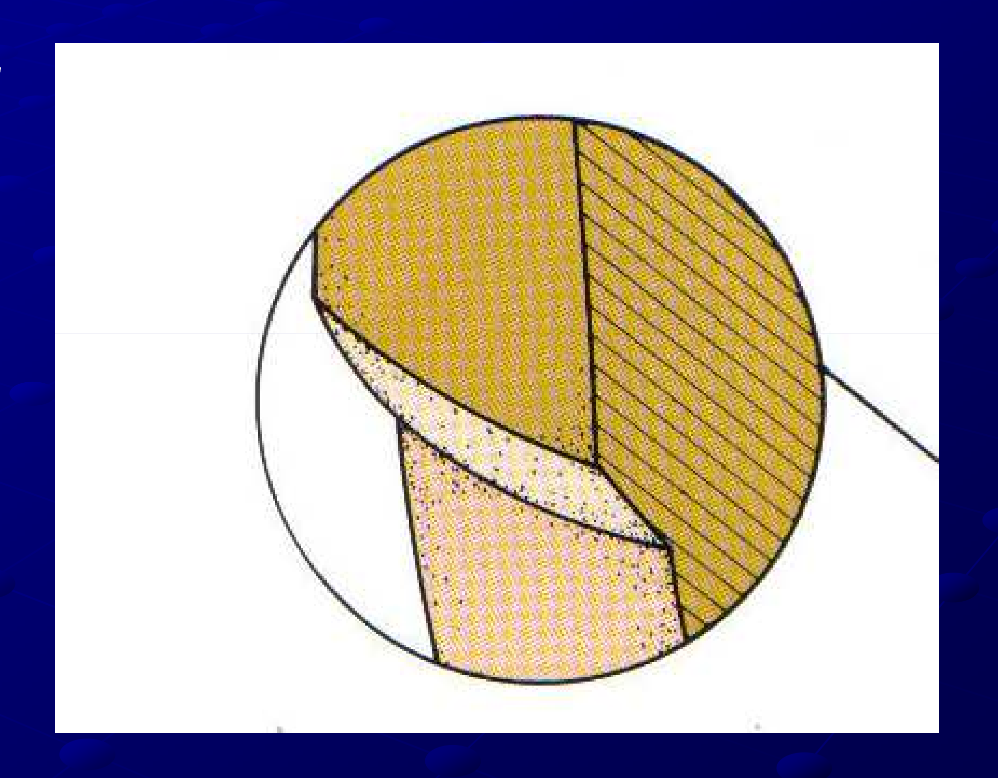
3-teeth with very convex surface

Advantage : conservative

Disadvantage :

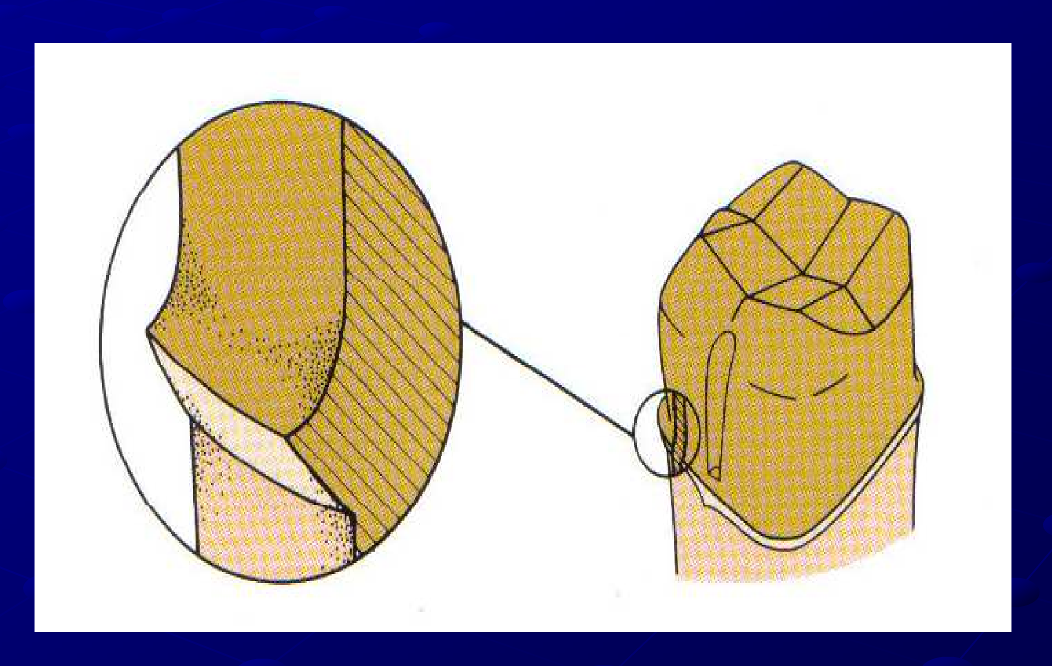
1-location of margin difficult to control

2- over contoured restoration



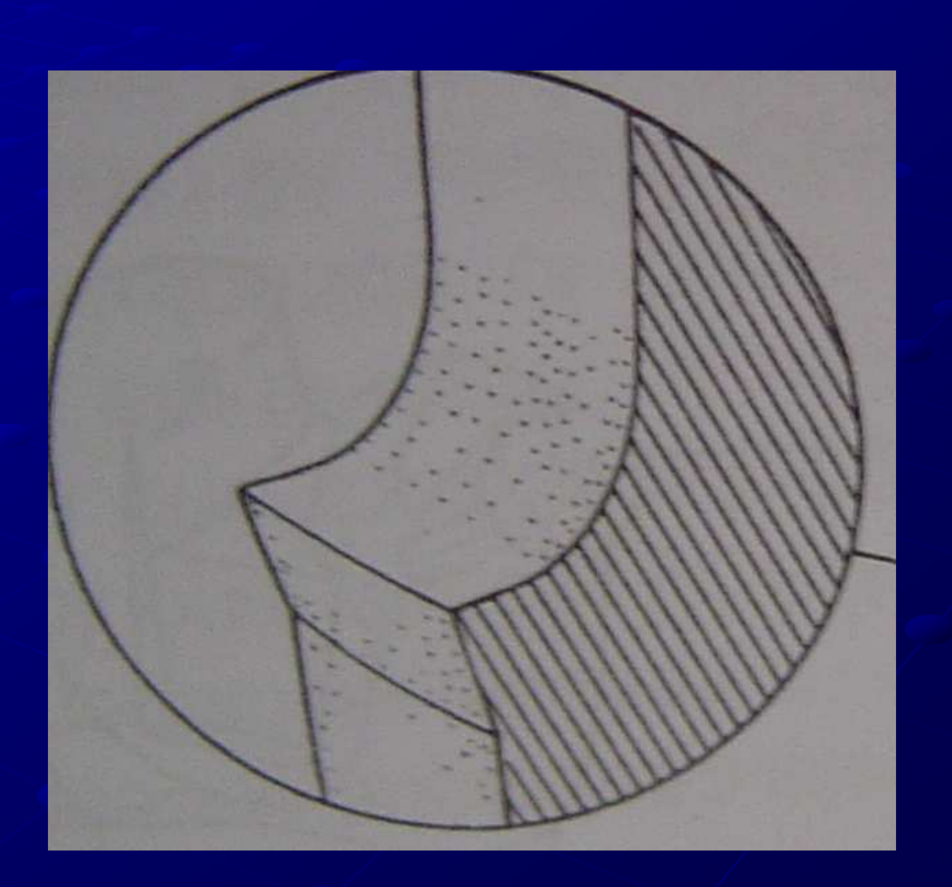
3-Chamfer finish line

- Used with cast metallic restoration and metal portion of cast metallic restoration
- Instrument used is tapered diamond with rounded end
- Advantage :definite margin, adequate bulk, easy to control
- Disadvantage :care is need to prevent unsupported enamel lip

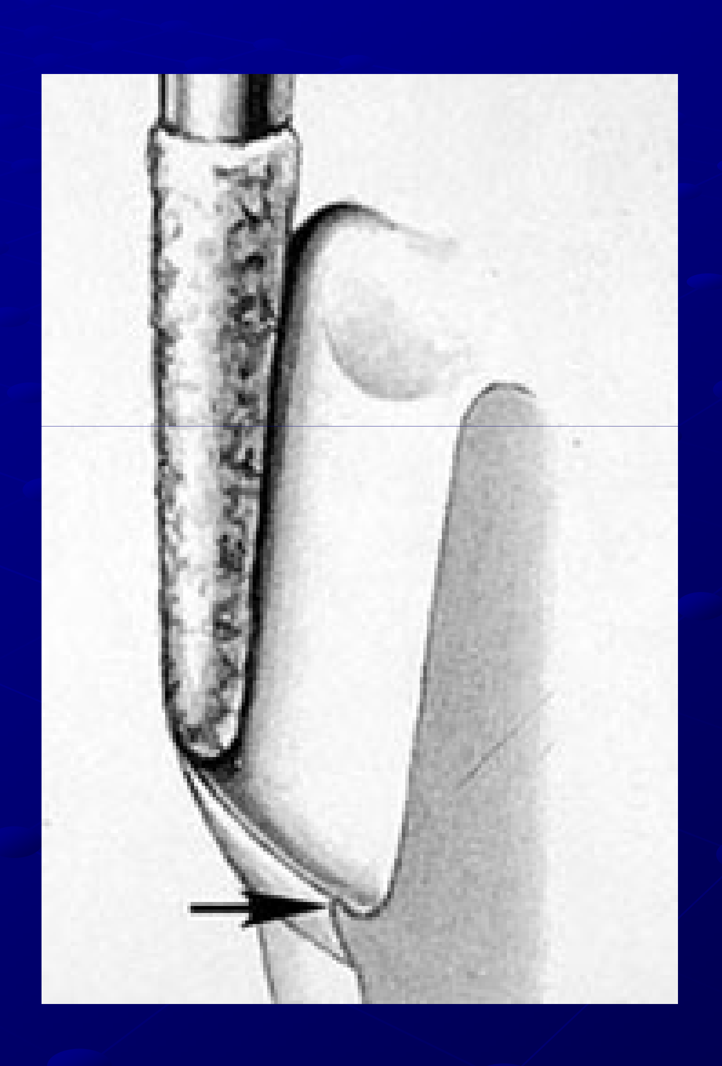


Deep chamfer

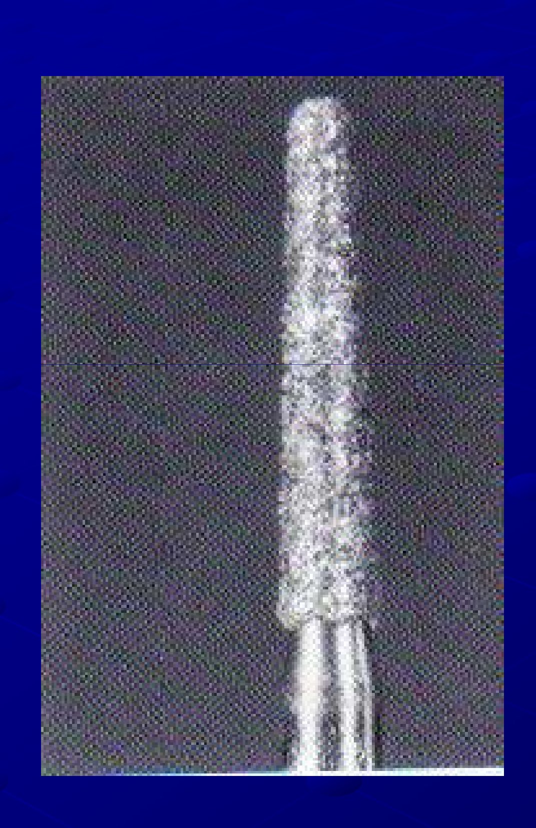
- Used with all ceramic restorations



Enamel lip



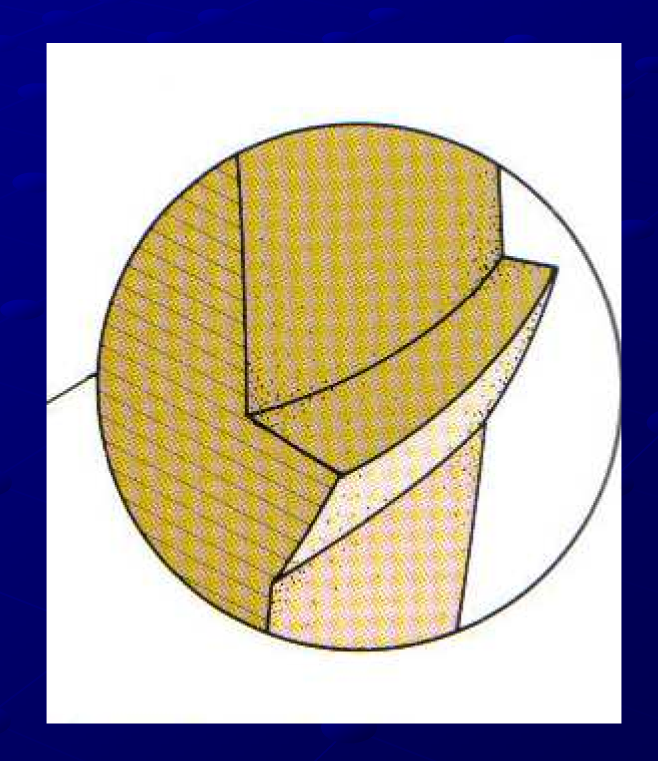
Tapered stone with round end





5- Shoulder finish line

- Used with :all ceramic restorations and facial margin of metal ceramic restorations
- Prepared with diamond stone with flat end
- Advantage : give adequate bulk
- Disadvantage less conservative

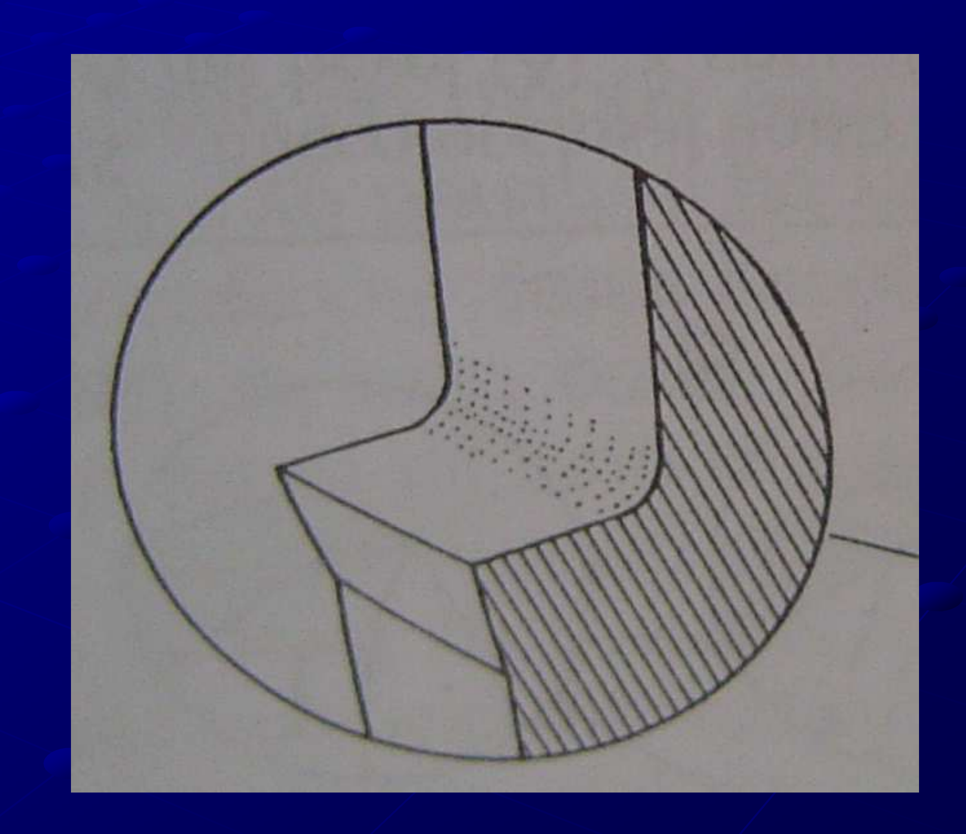


Tapered stone with flat end



6- Radial shoulder

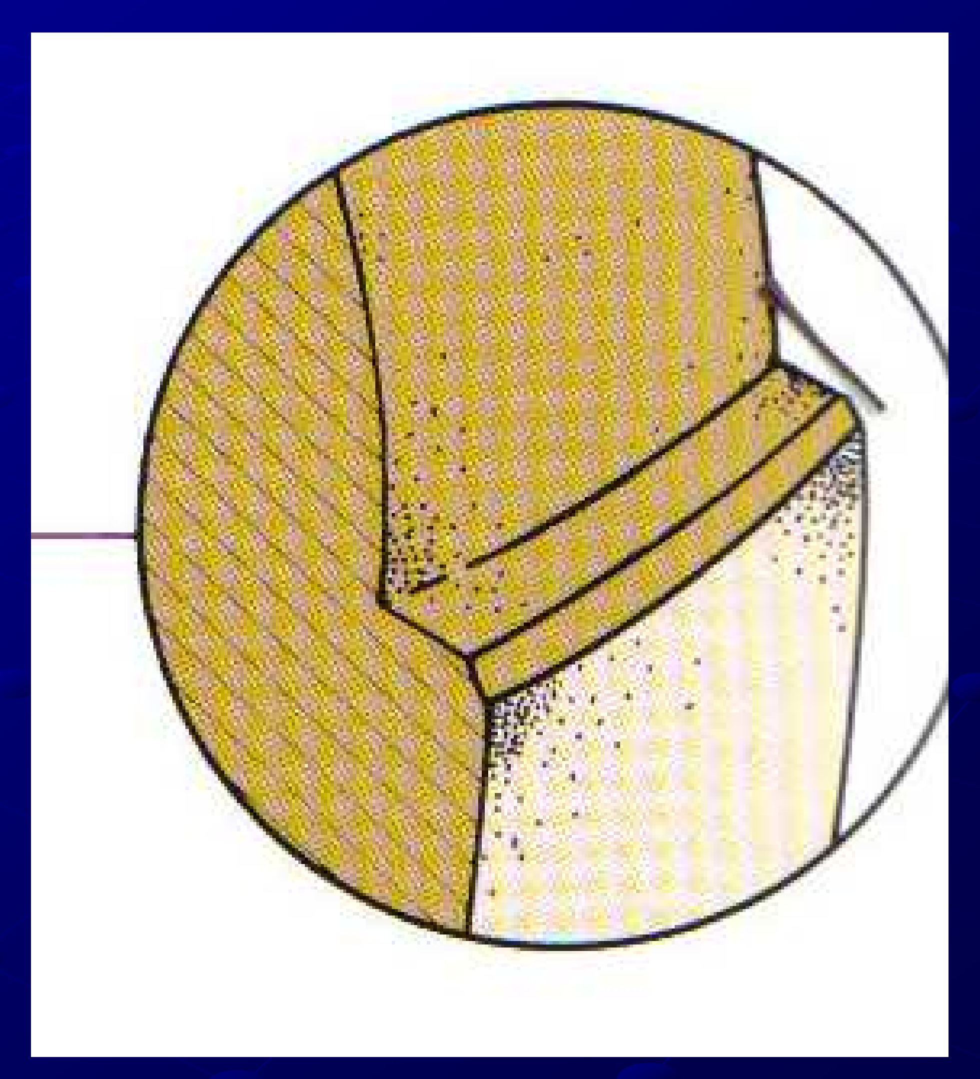
- Modified form of shoulder
- used with all ceramic restorations
- Advantage : claimed to produce less stress concentration that shoulder
- Instrument :diamond with flat end then end cutting carbide bur then bin angle chisel



7-shoulder with bevel

- Used with facial margin of metal ceramic crown
- Advantage : 1-give adequate bulk

  2-removing unsupported enamel
- Disadvantage less conservative



5-preventing of tooth fracture

According to the remaining tooth structure crown better than onlay than inlay







amza

Mechanical considerations

Mechanical considerations are divided into :

1- Providing retention form

2- Providing resistance form

3-Preventing deformation of the restoration(structural durability)

1-Retention form

- Definition

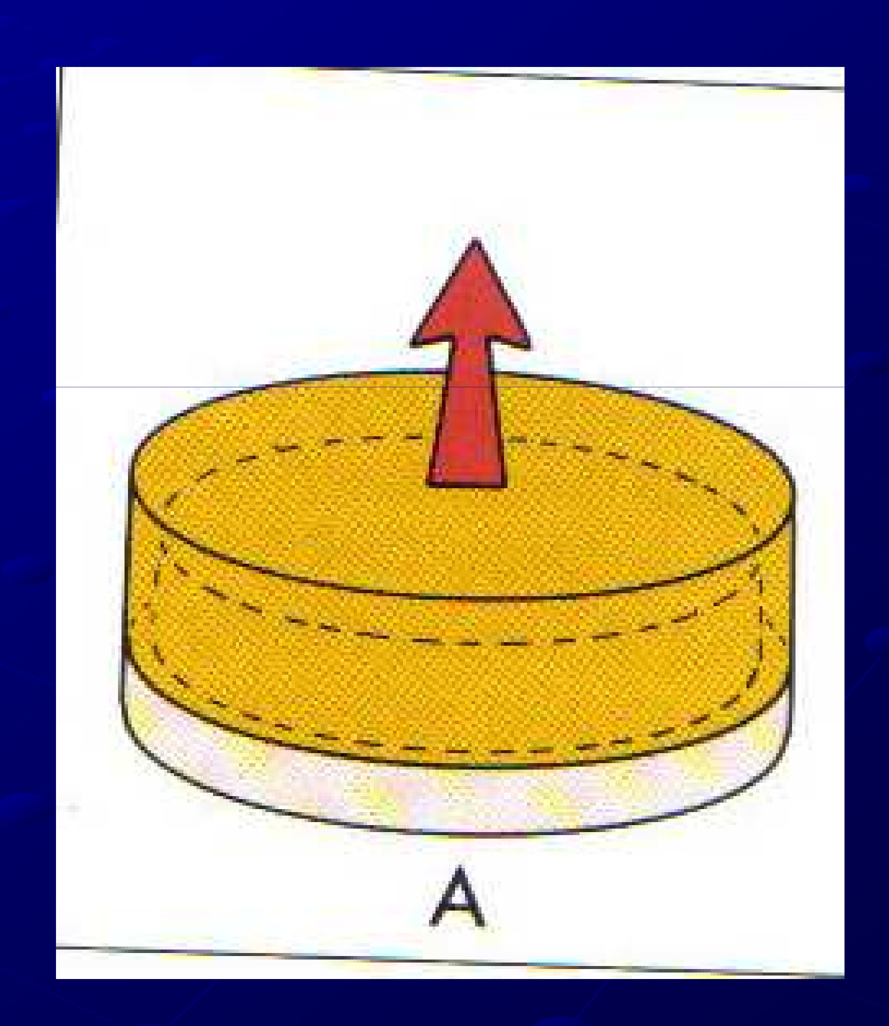
  Retention form is that feature in the preparation that prevent removal of the restoration along the path of insertion

Factor affecting retention form

1-Magnitude of dislodging force

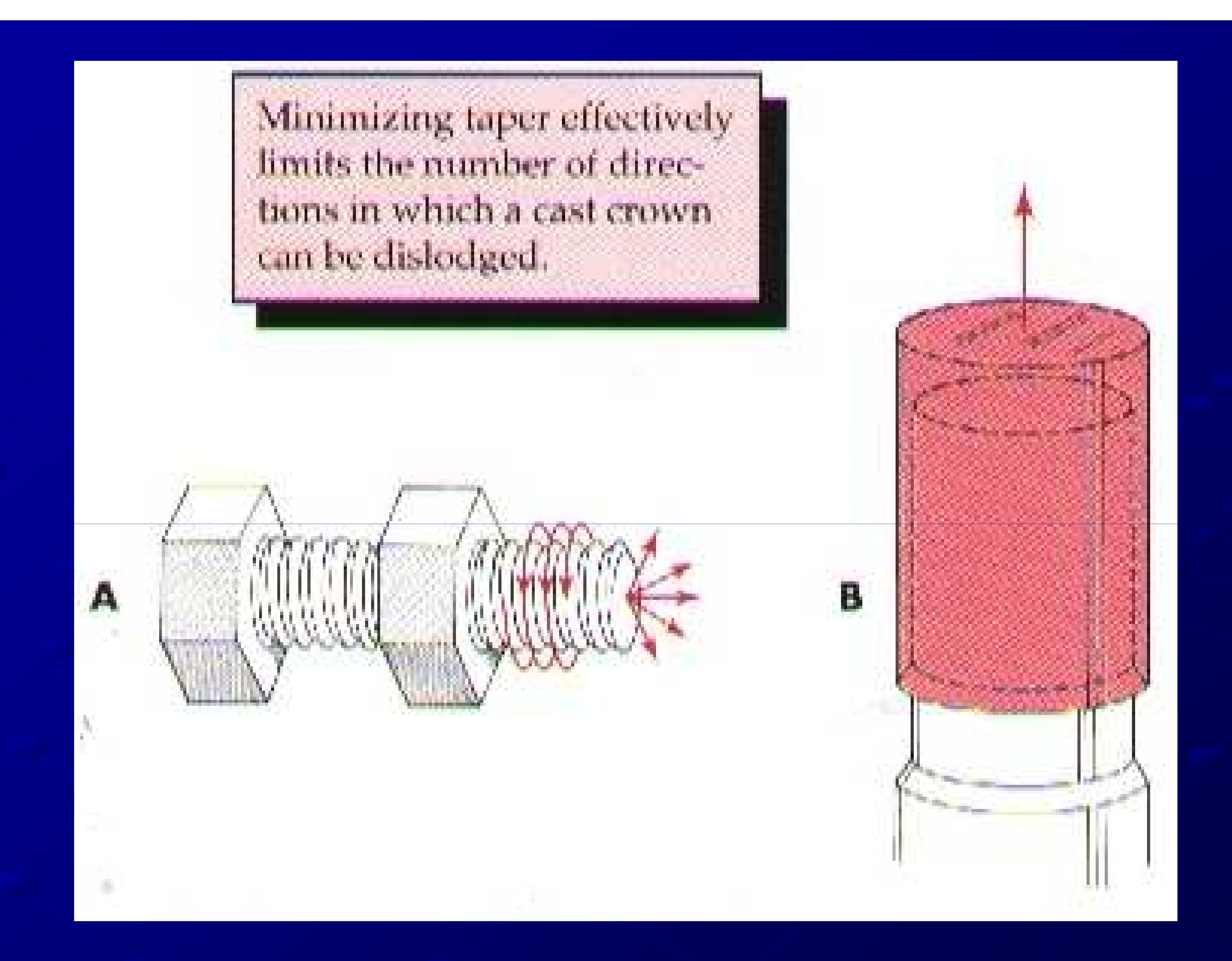
Force that tend to remove the cemented restorations along its path of withdrawal along forces that tend to tilt it

e.g. sticky food

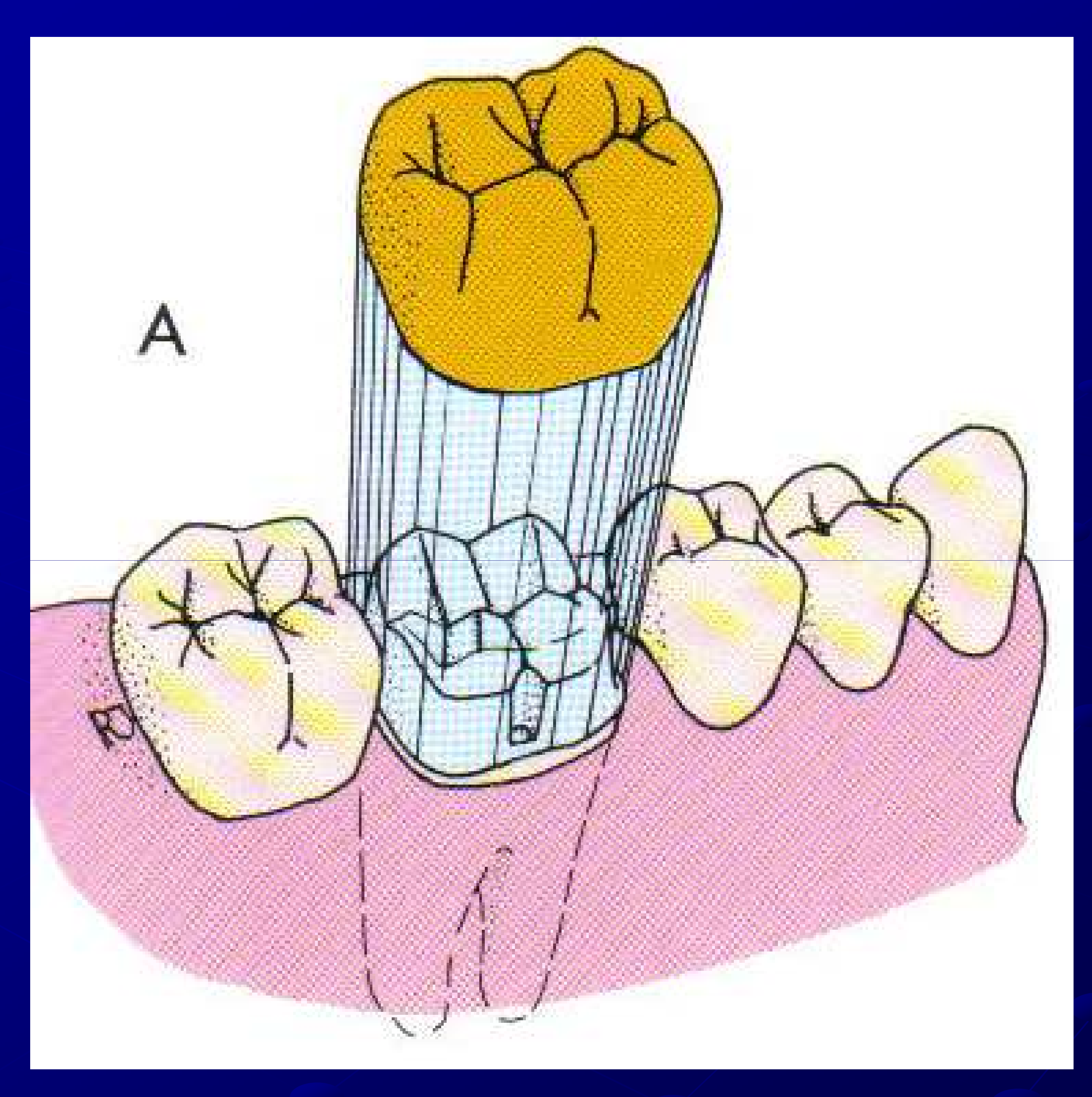


Path of insertion

- It is the direction through which the restoration could be precisely seated on the prepared tooth or teeth



Minimizing taper effectively limits the number of directions in which a cast crown can be dislodged.
A
B

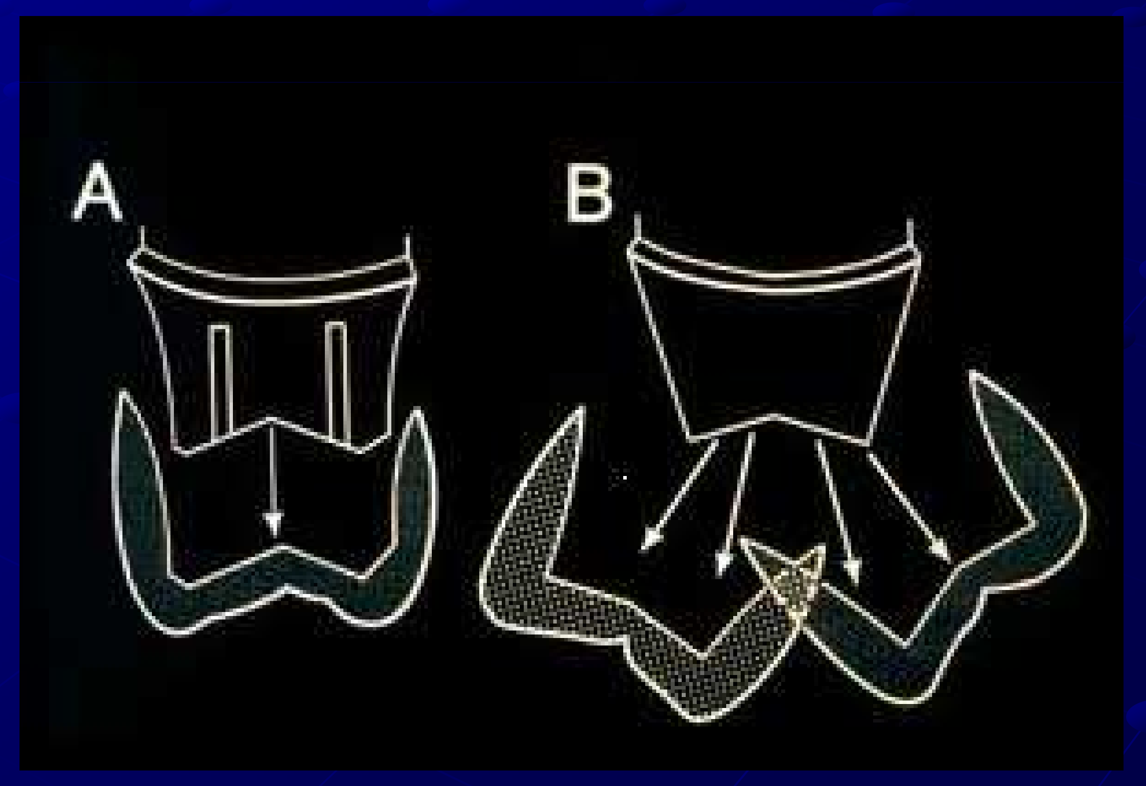

A
R

Classification of path of insertion

For a single restoration

1- line of insertion

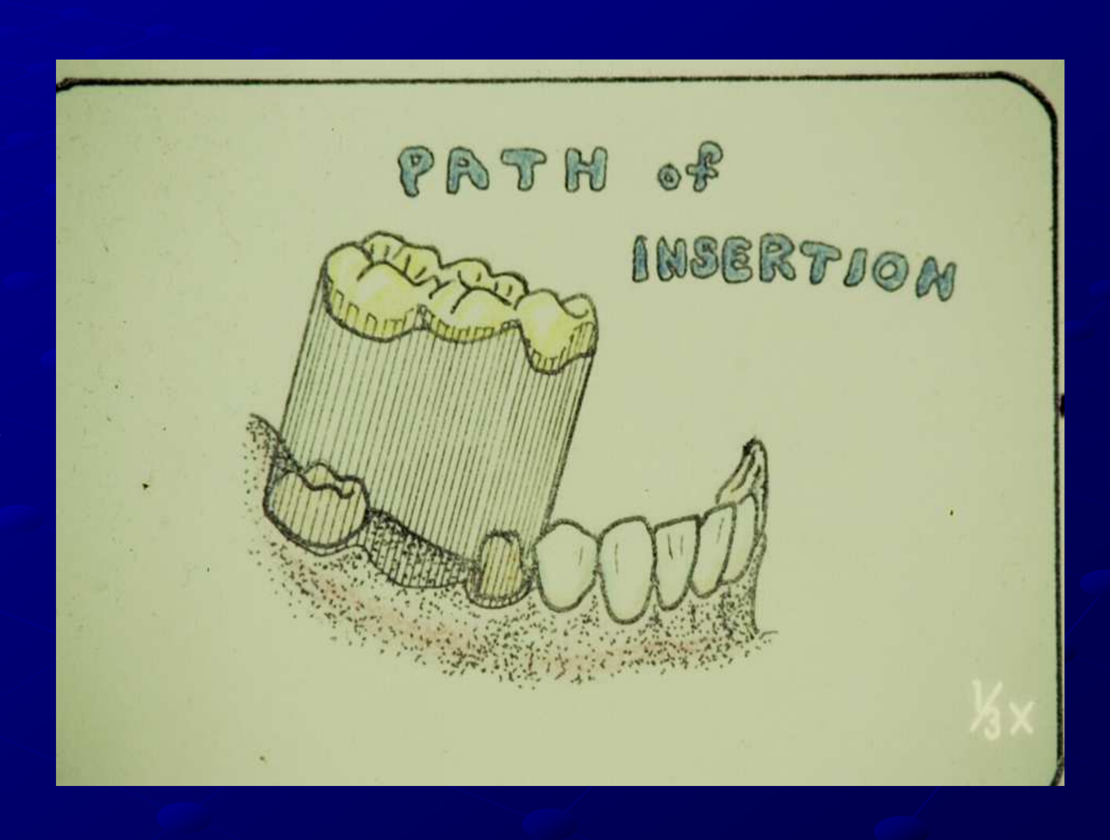
2-range of insertion

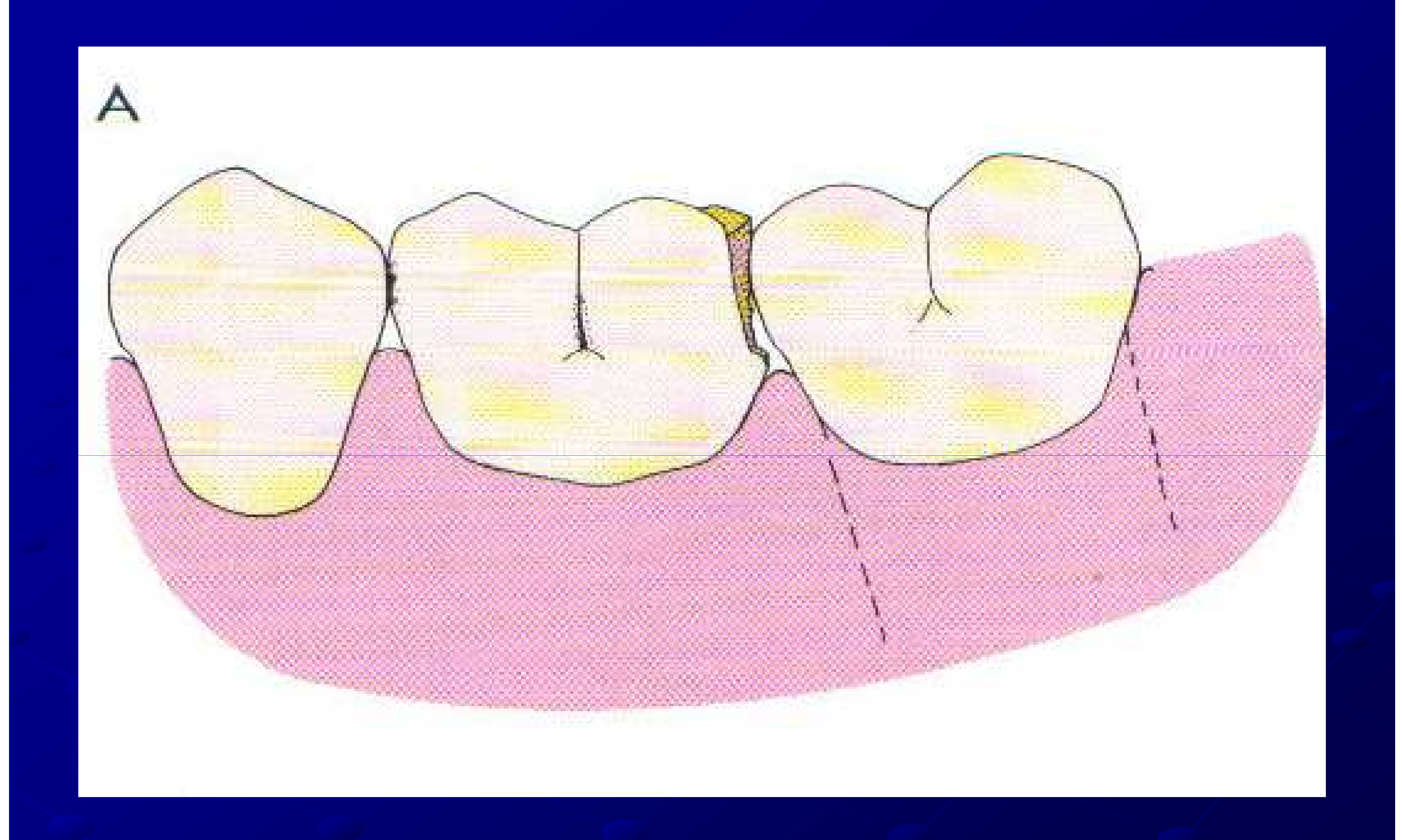


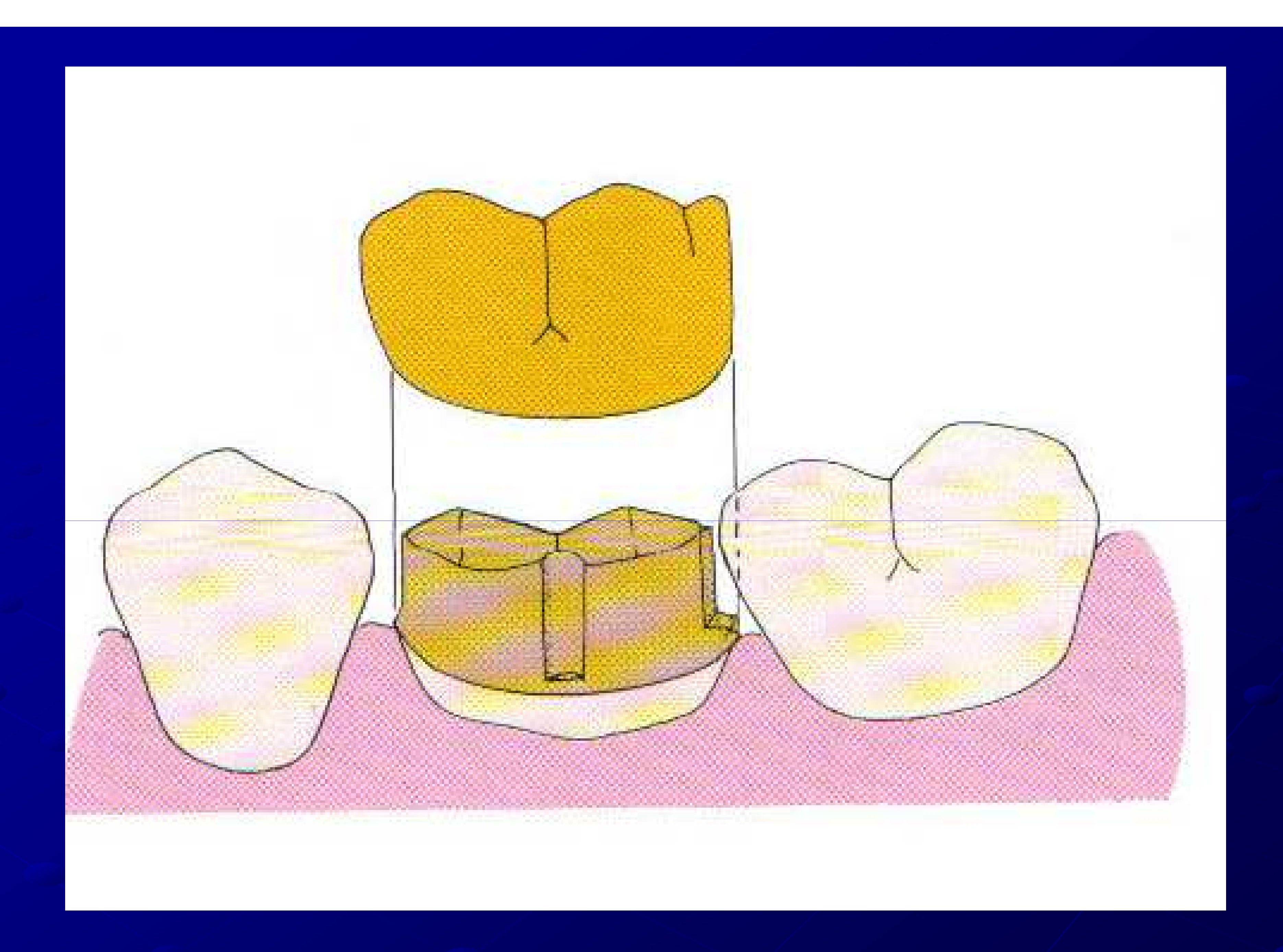
- For a bridge restoration

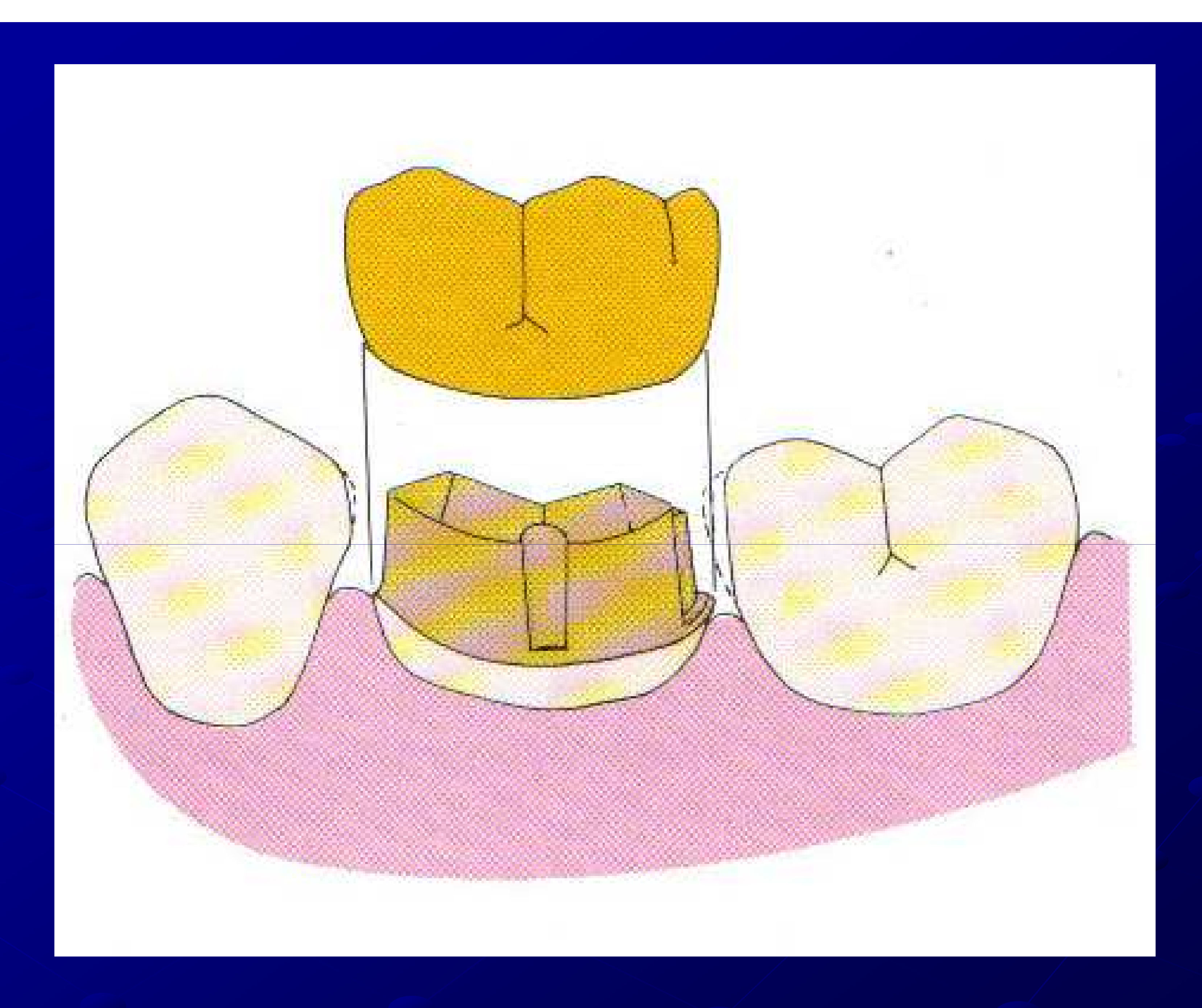
1- common line of insertion

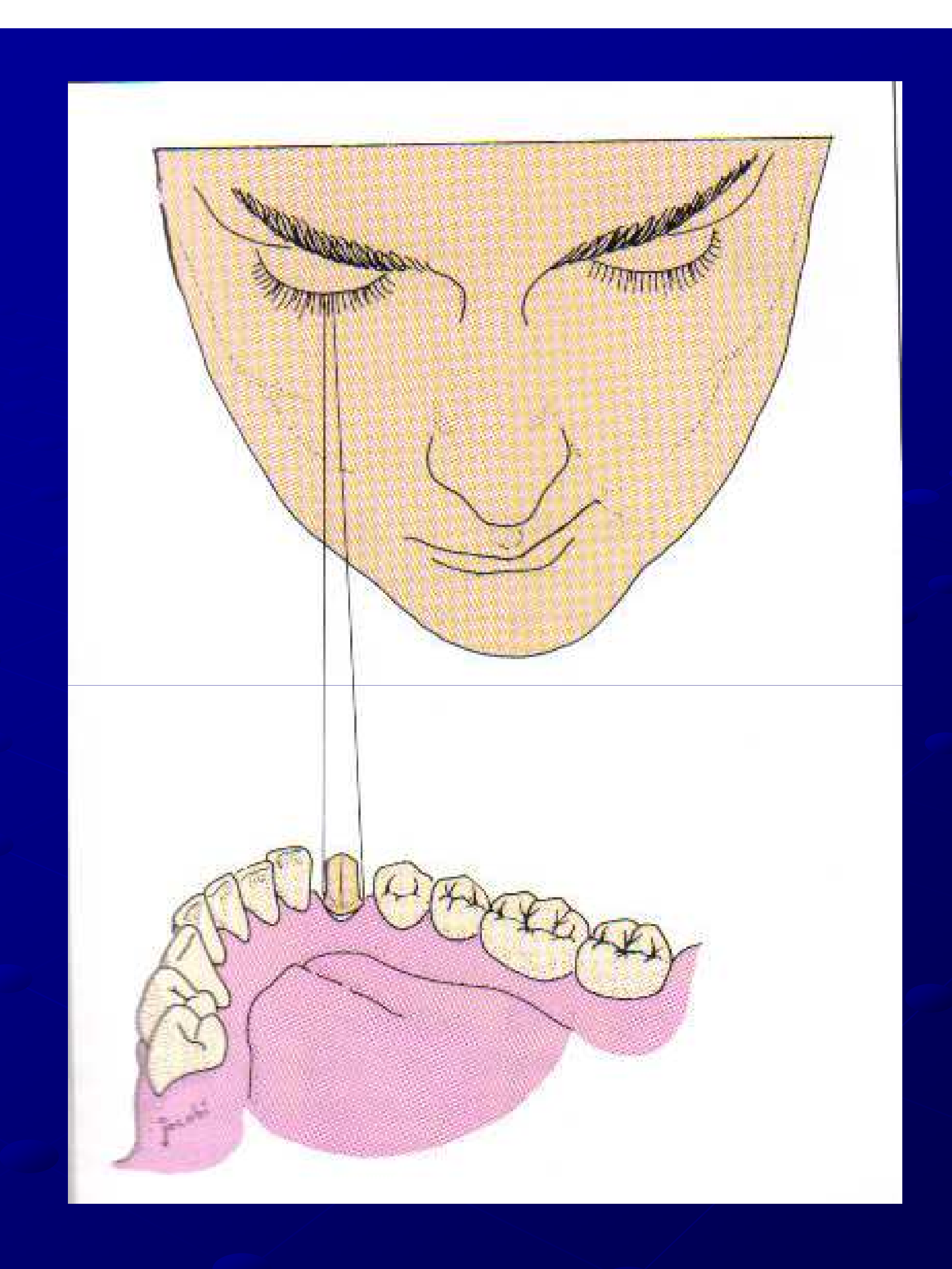
2- common range of insertion

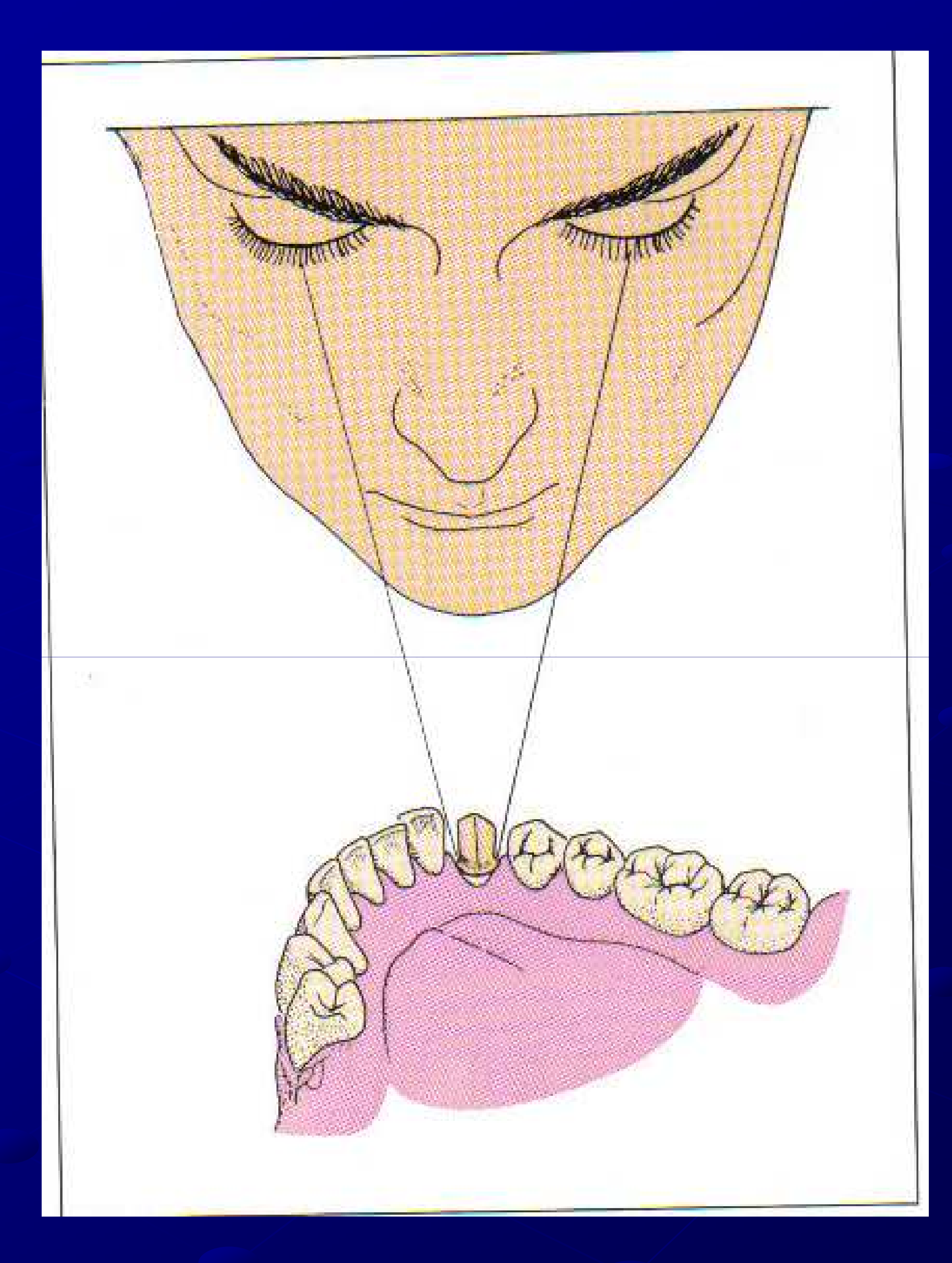


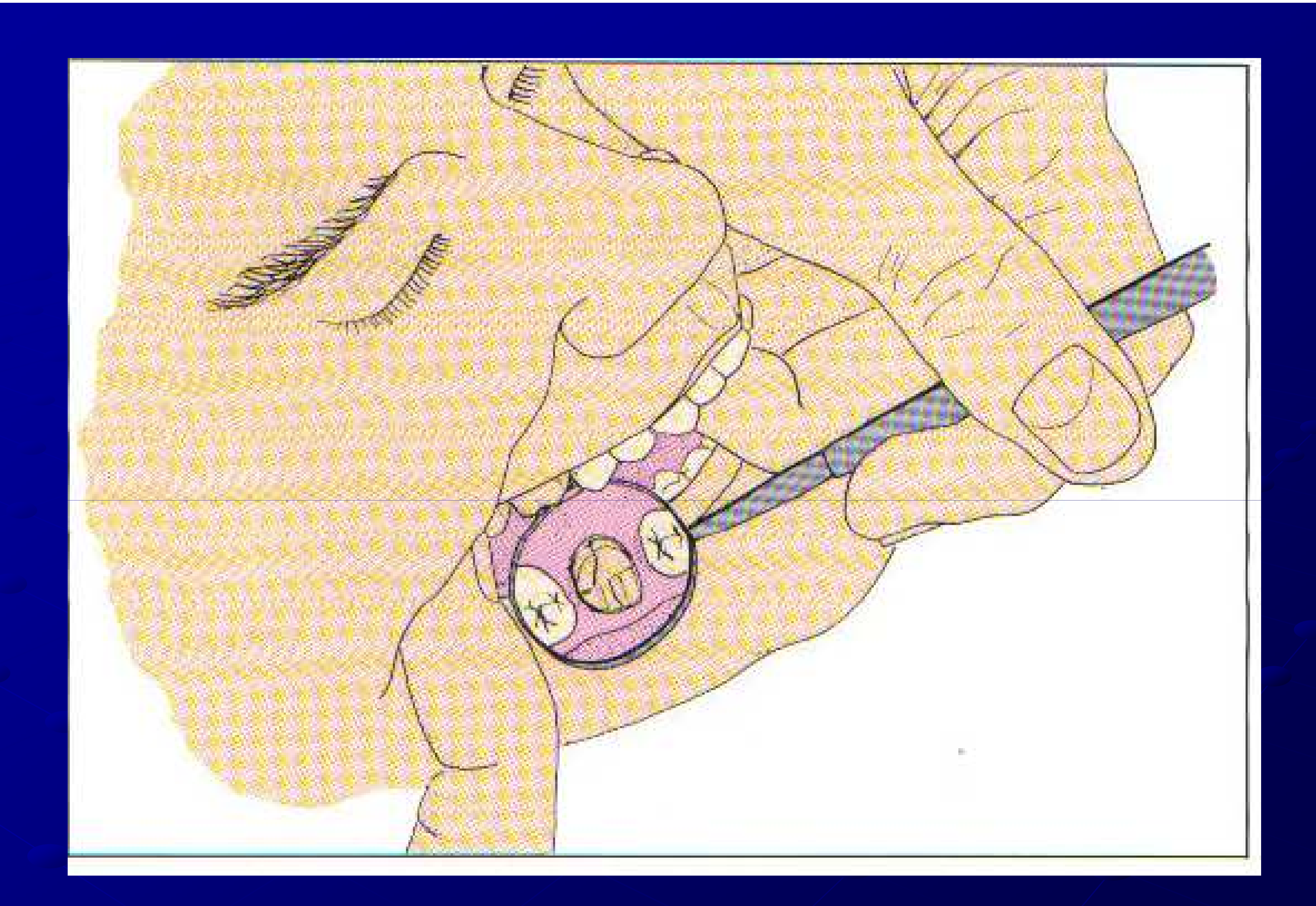

A



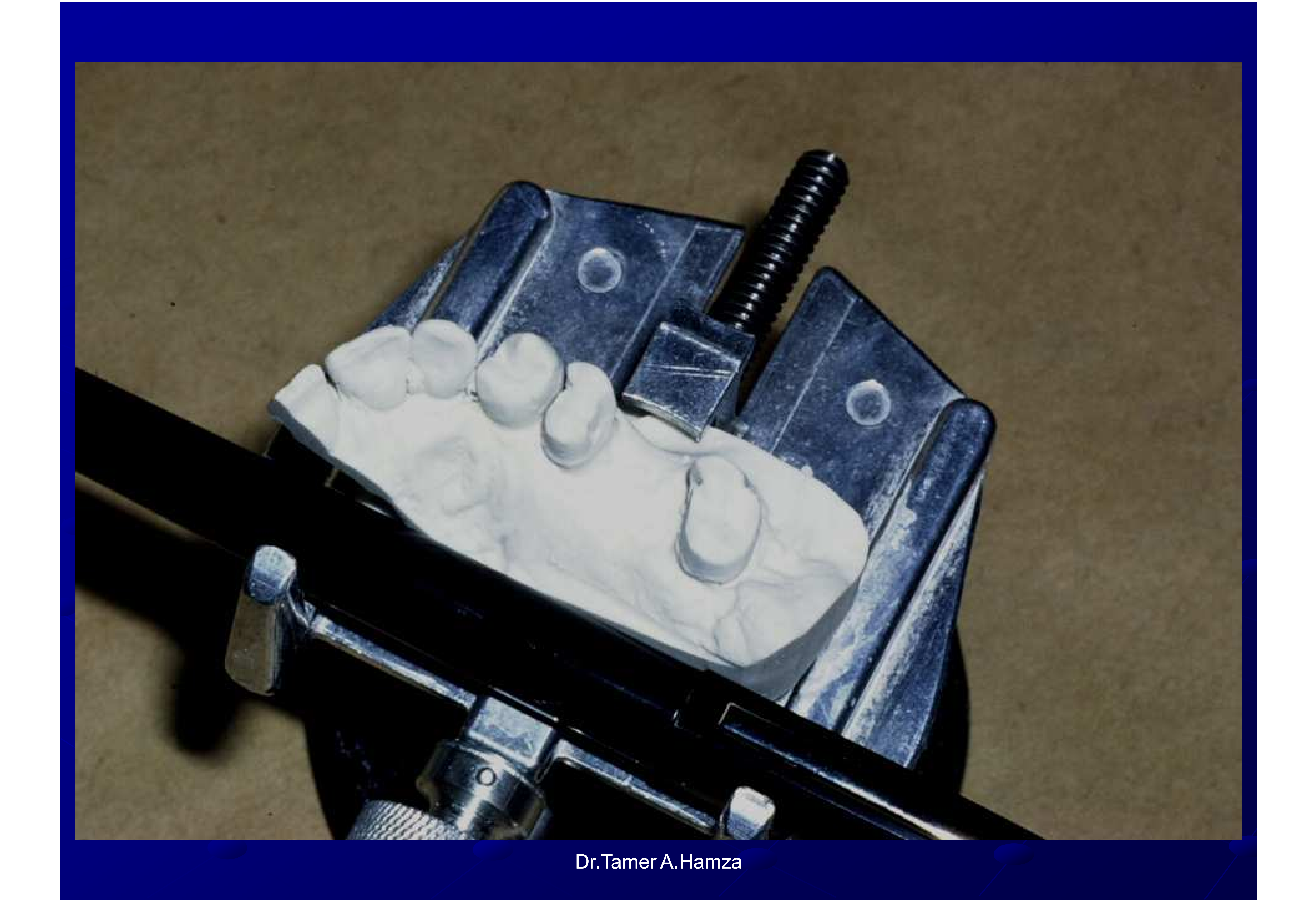


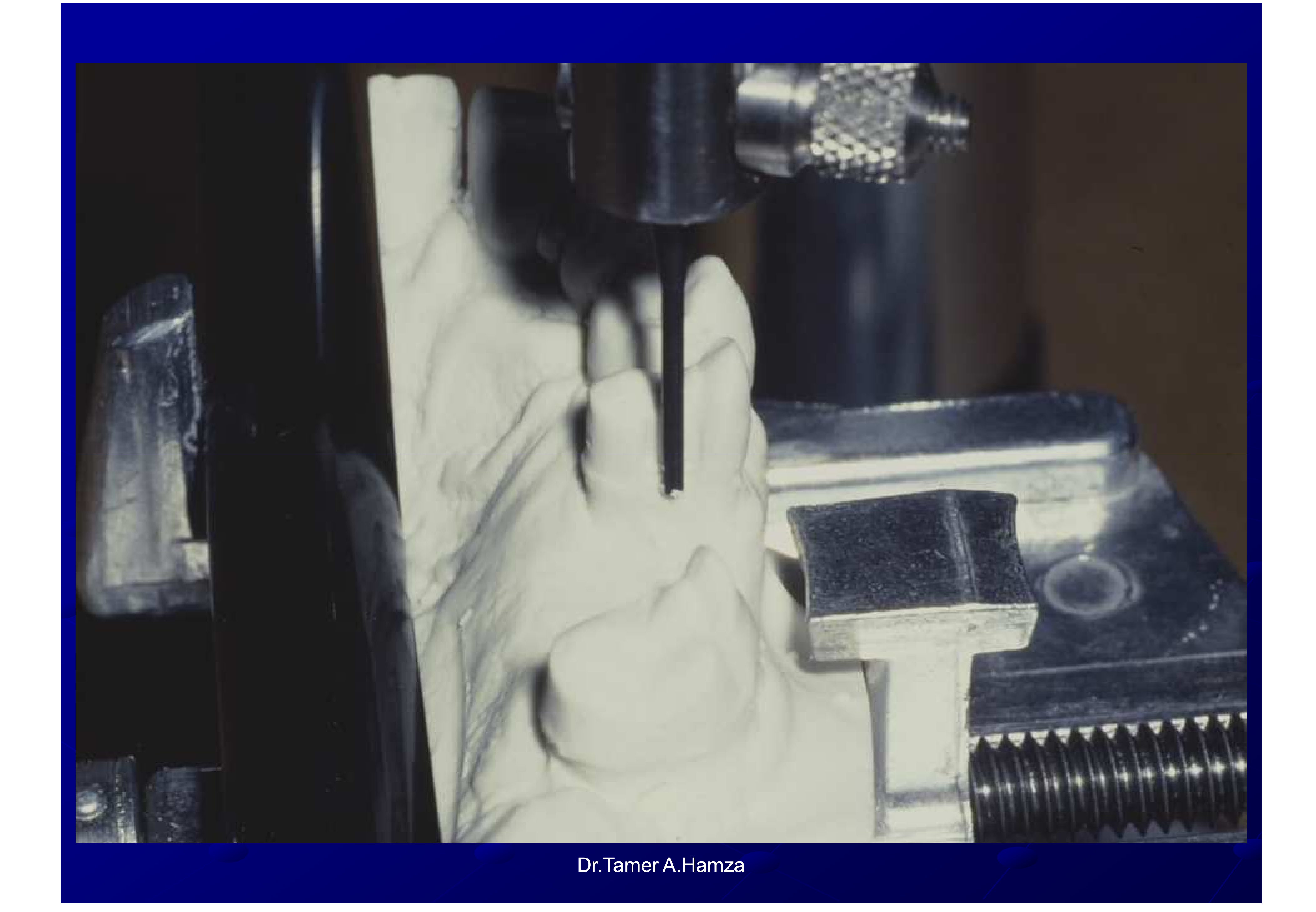








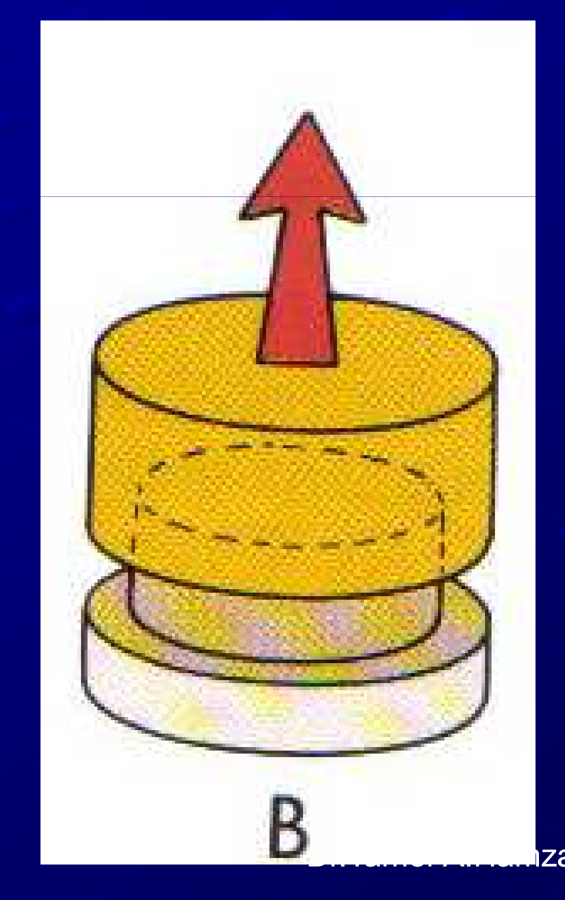


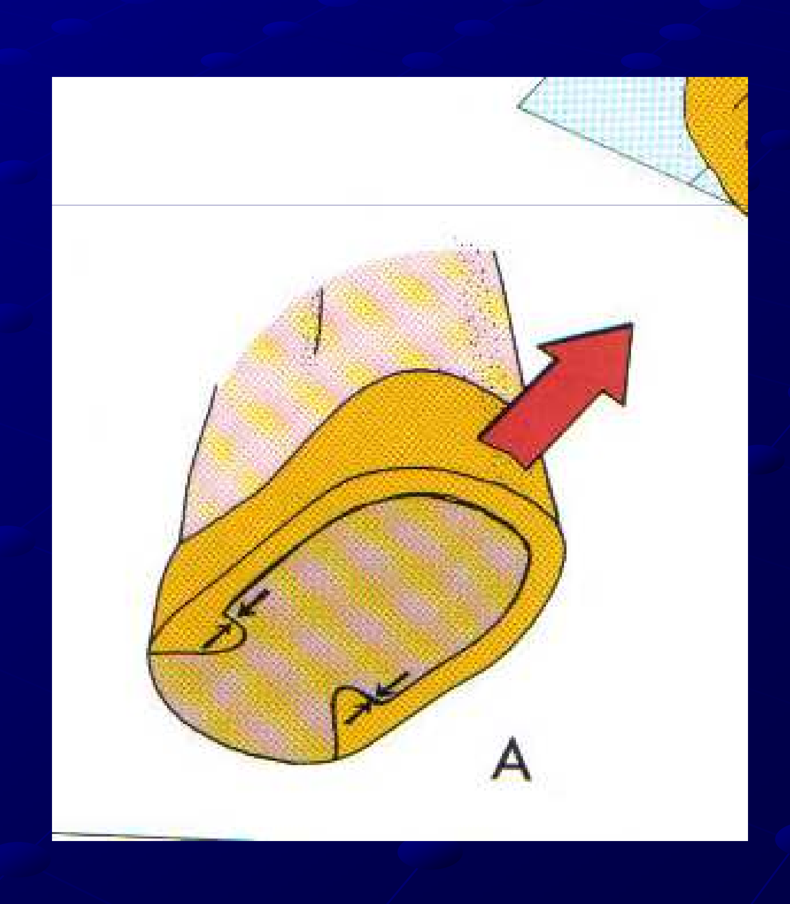




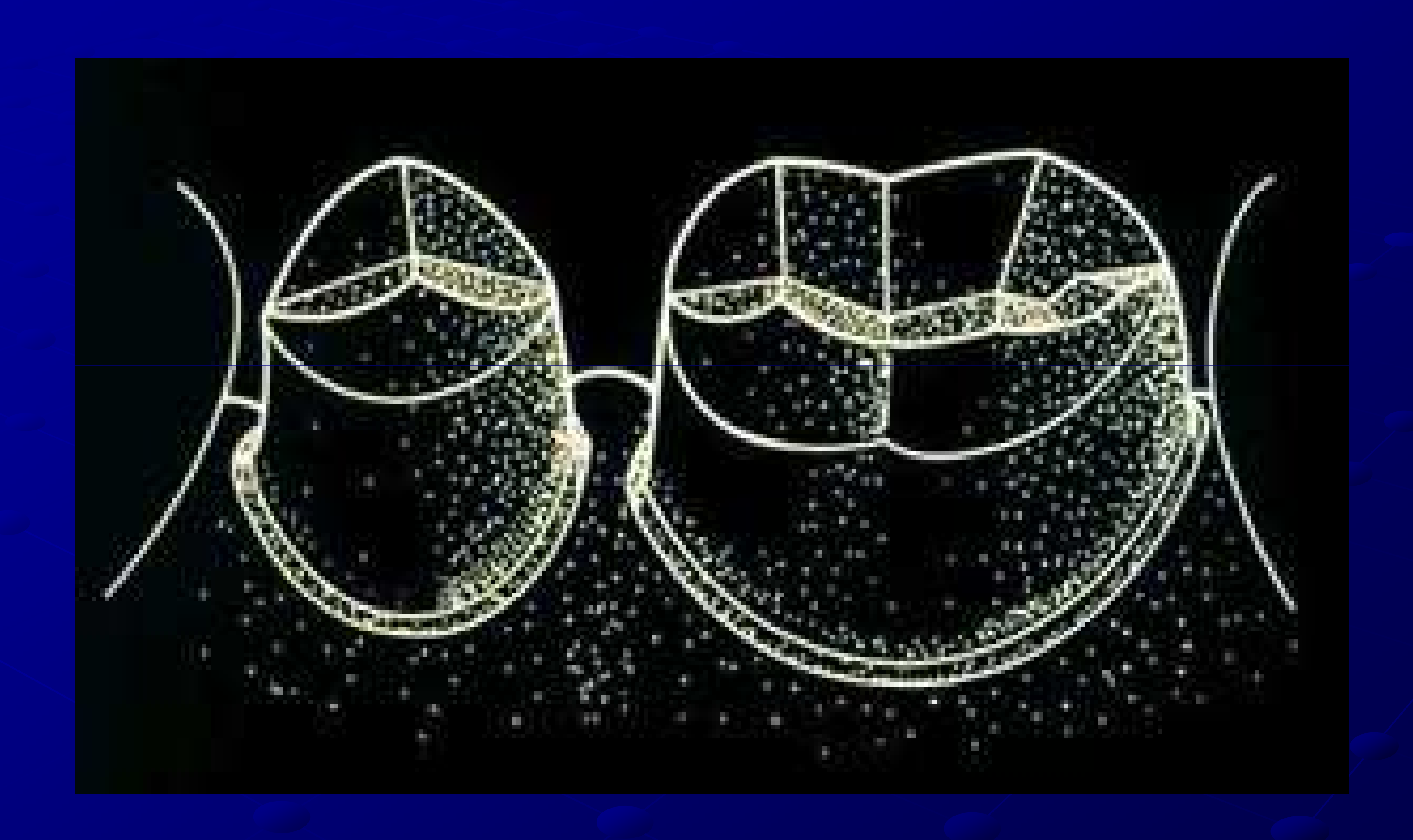
2-Gemotry of the prepared tooth

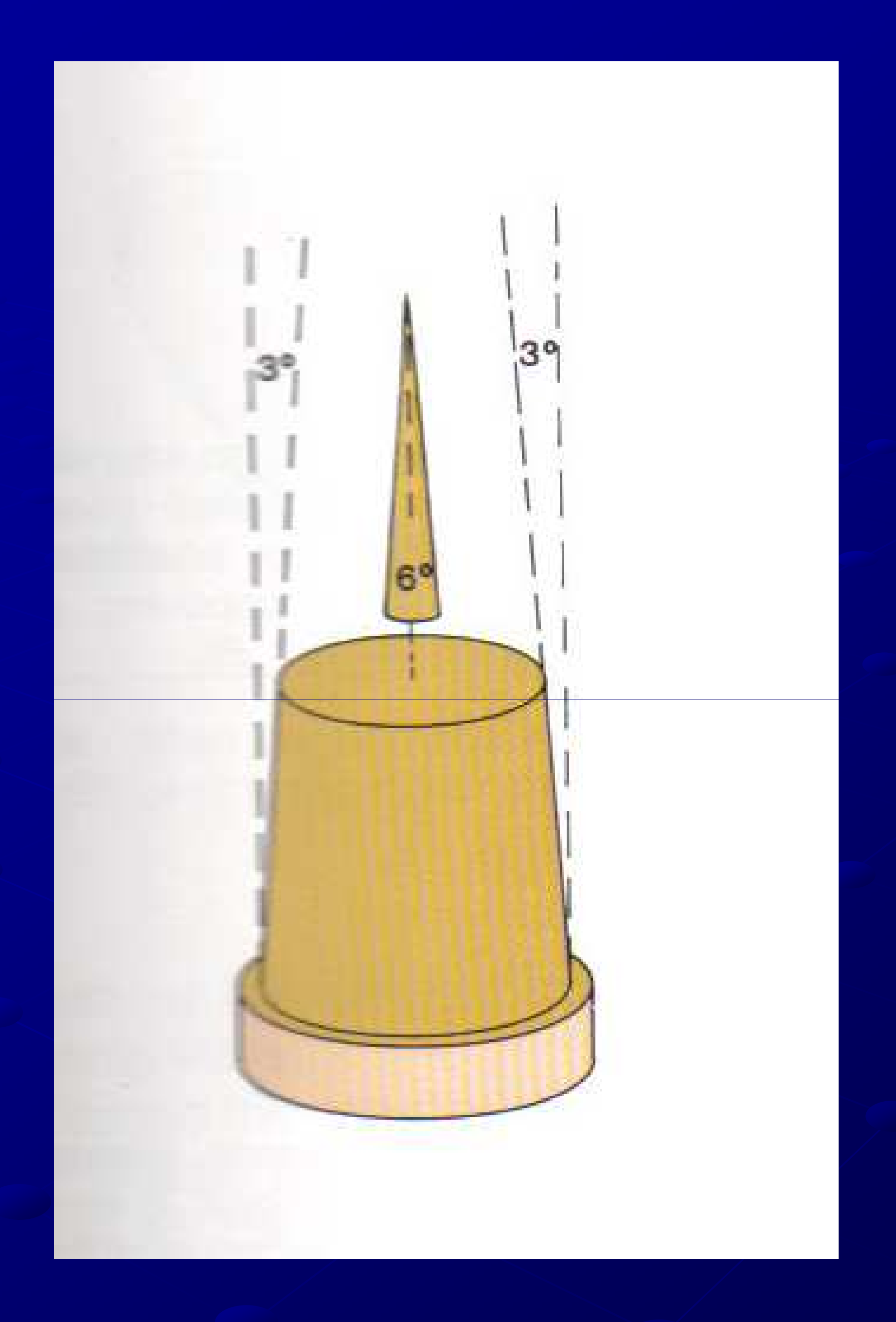
a- Type of the preparation

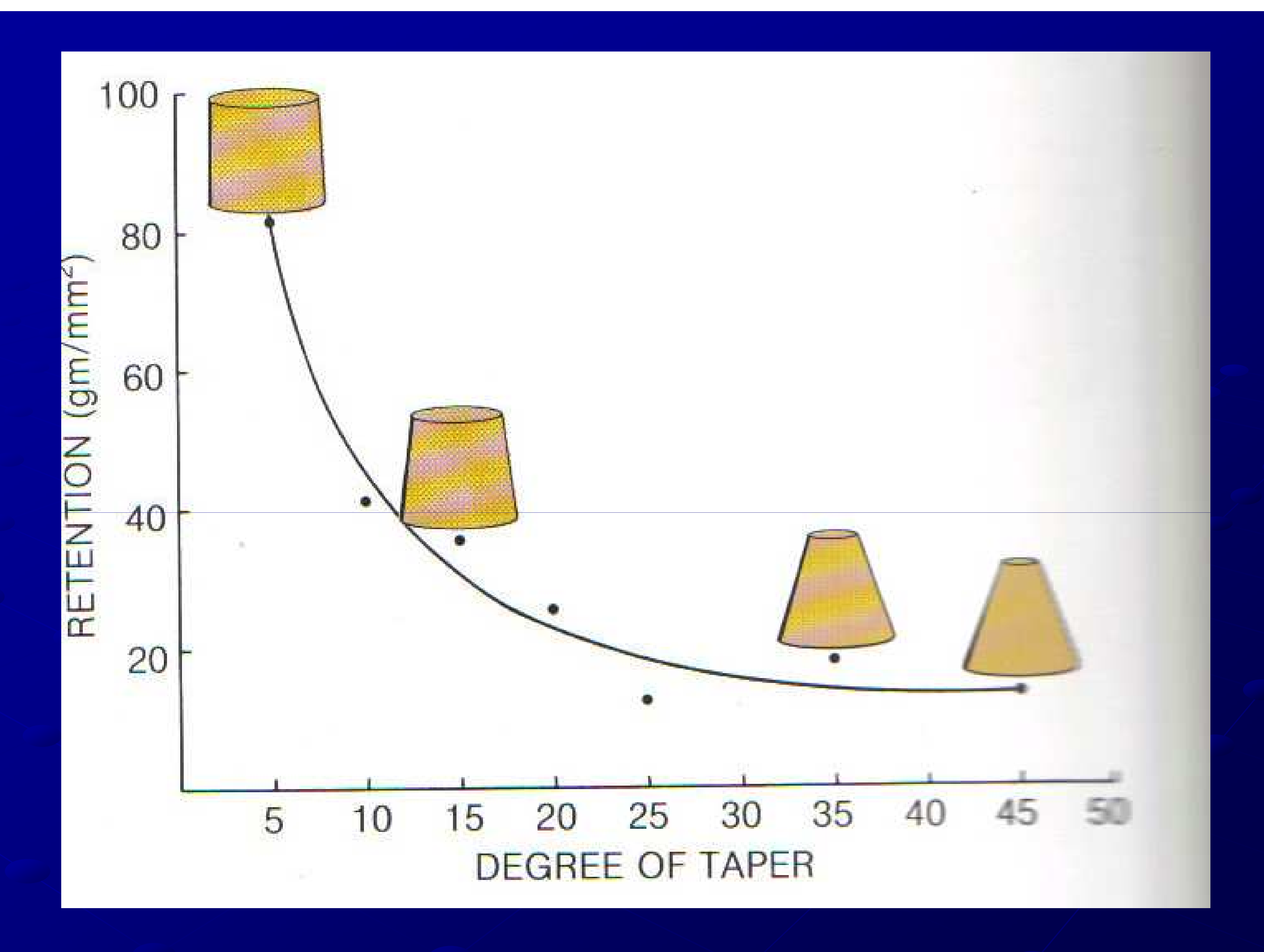




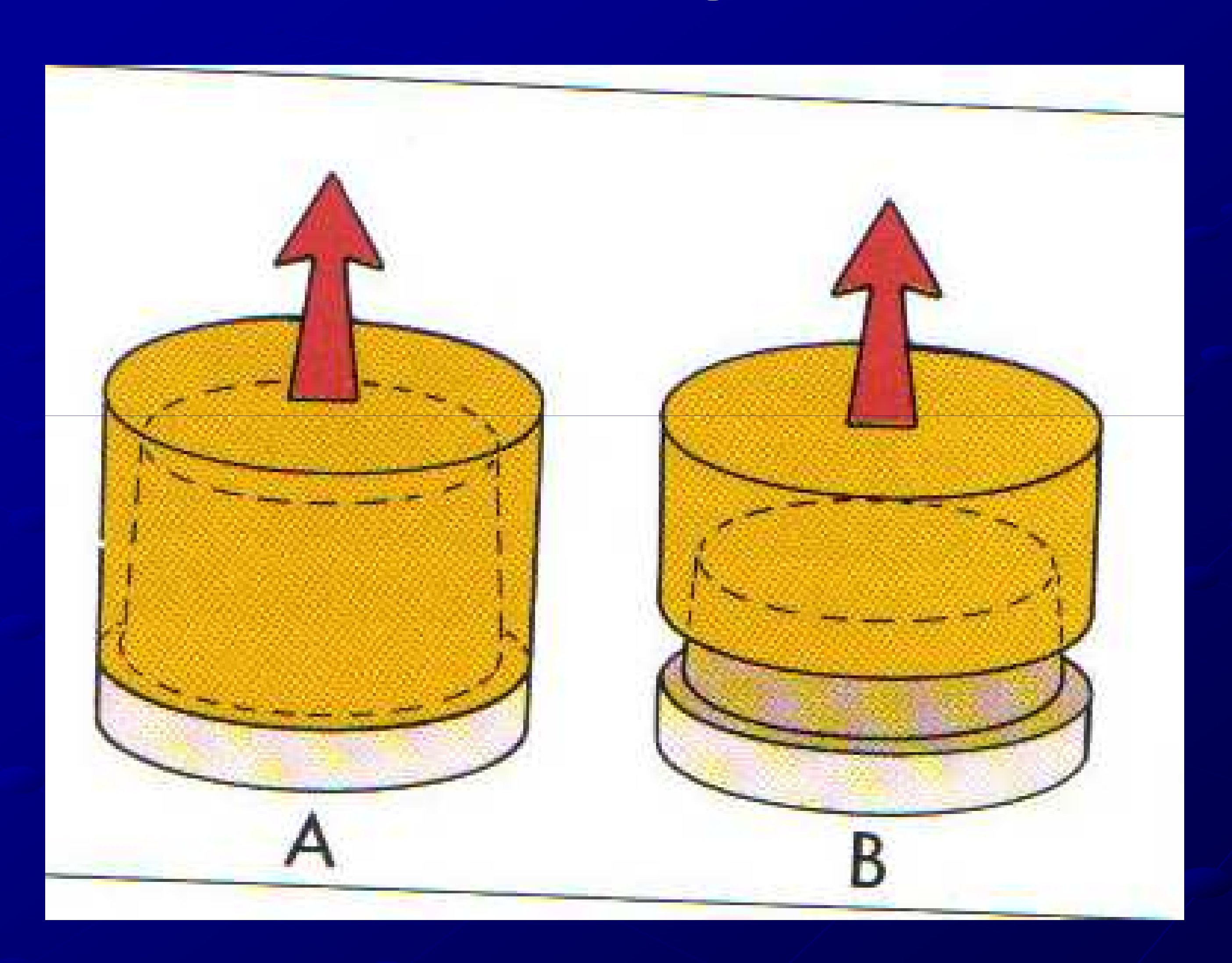
b-Taper




3°
3°
6°


100
80
60
40
20
RETENTION (gm/mm²)
5
10
15
20
25
30
35
40
45
50
DEGREE OF TAPER

B-Length

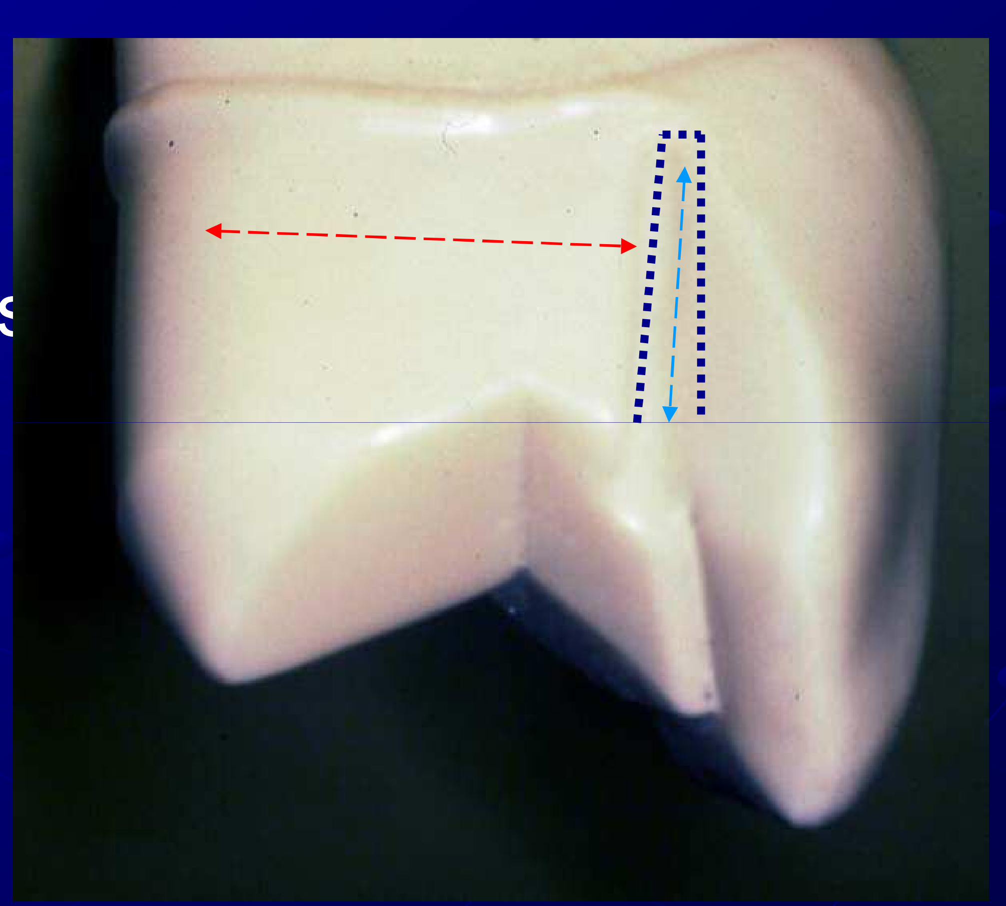


Preparation features

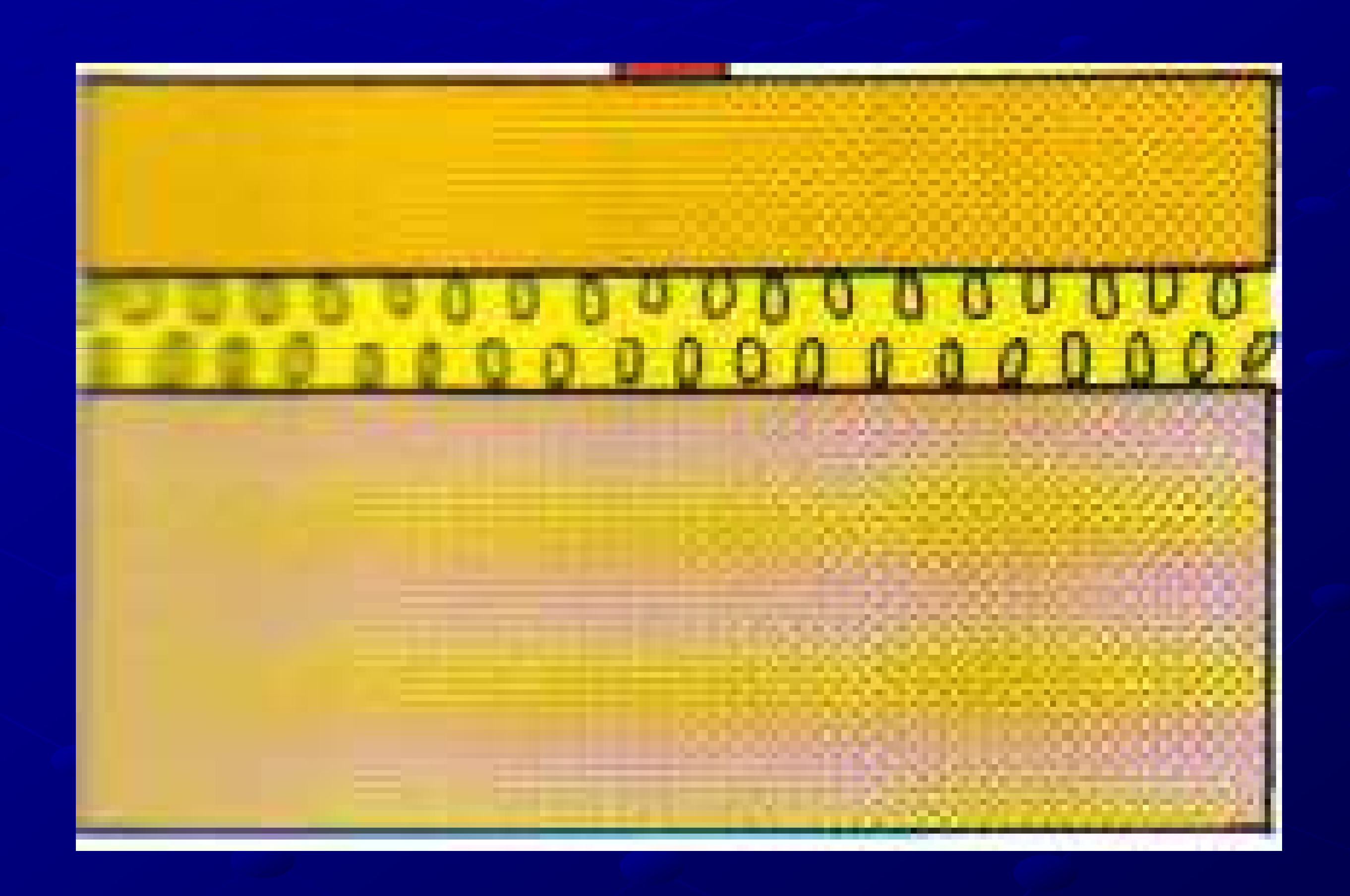
This include :

1-axial grooves :

2- pinholes and ledges



3-roughness of the fitting surface of the restoration



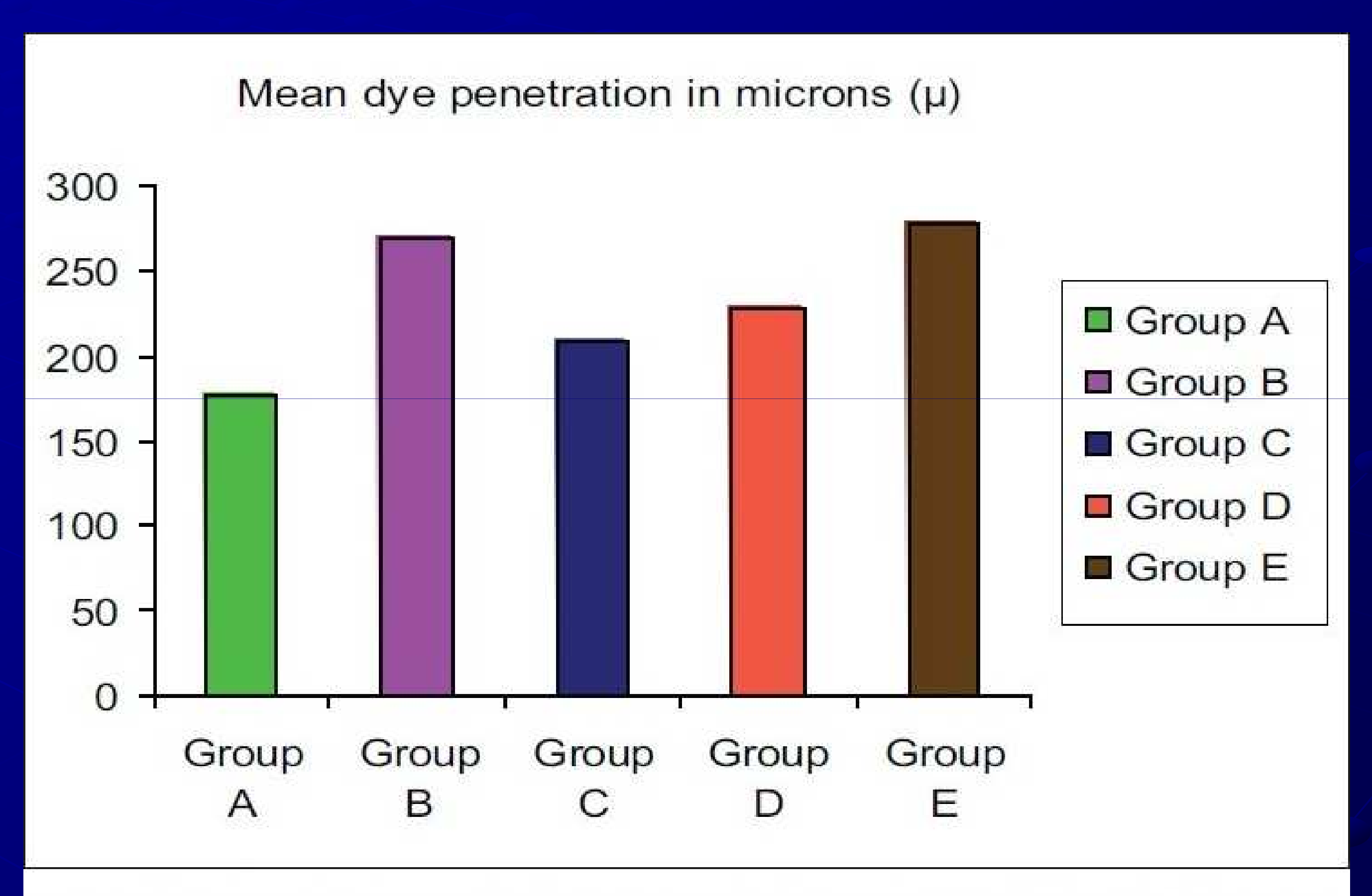
4-Material being cemented





- Base metal alloy is more retentive than gold alloys
- Amlagm cre is more retentive then composites

5-Type of the cement



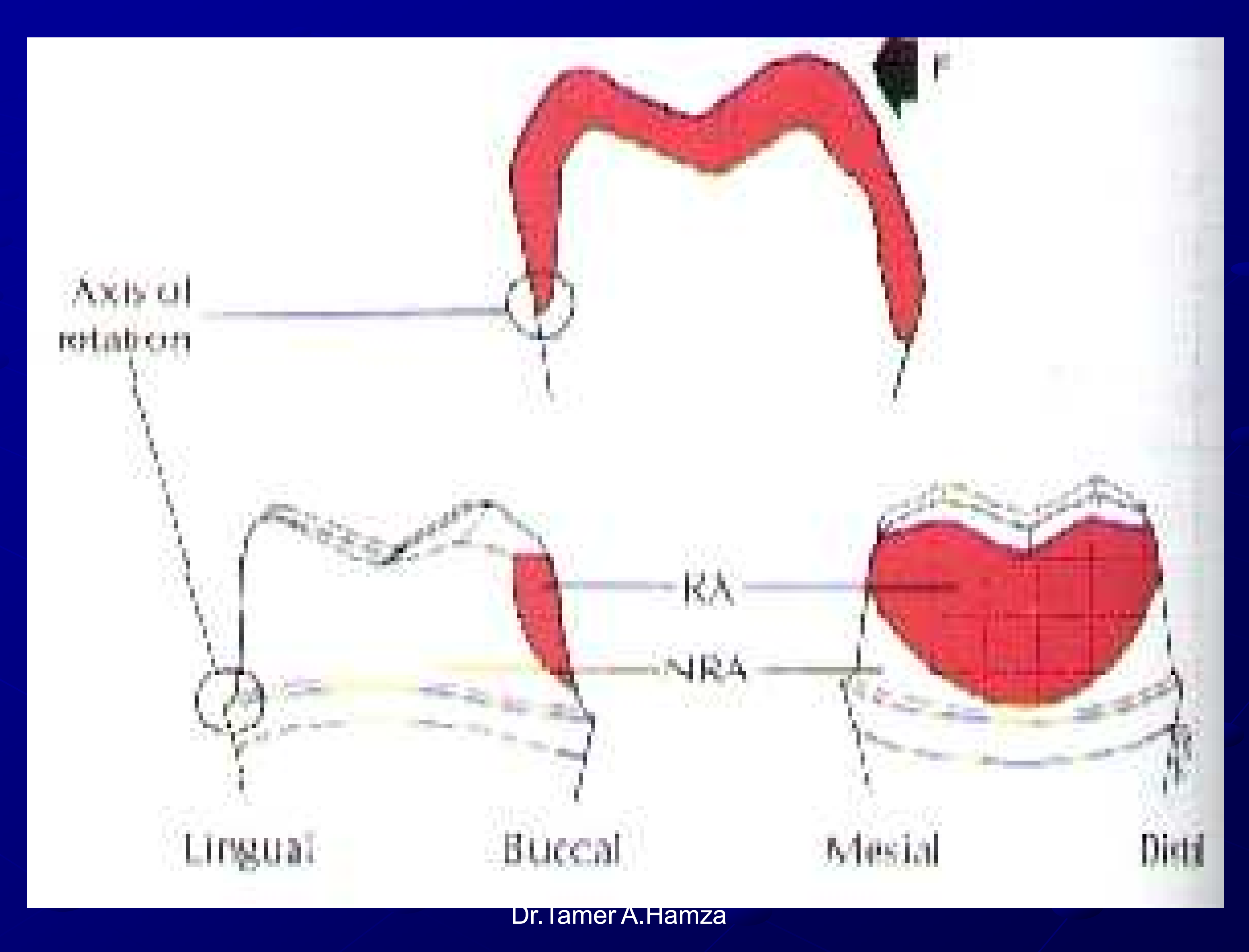
Graph 1: Comparison of dye penetration values of different groups

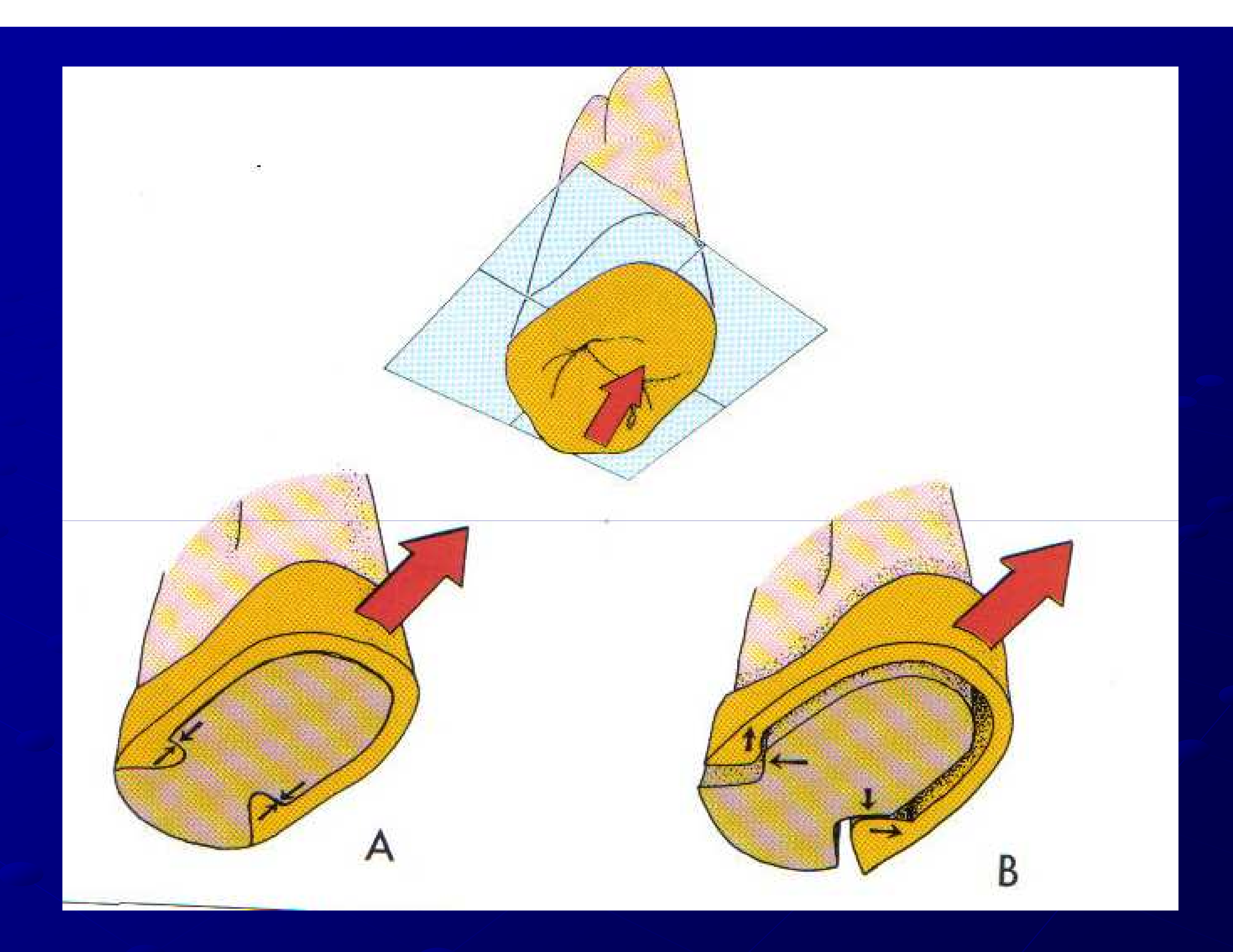
2-Resistance form

- Definition

  Resistance is that feature in the preparation that form prevent removal of the restoration under various occlusal forces(oblique and horizontal)

Tipping path




A
B

3-structural durability (resistance to deformation)



1- Alloy selection

- Base metal more stronger than gold and can used in thin section
- Gold type 1 and 2 used intracronal
- Gold type 3 and 4 used in crown and bridge

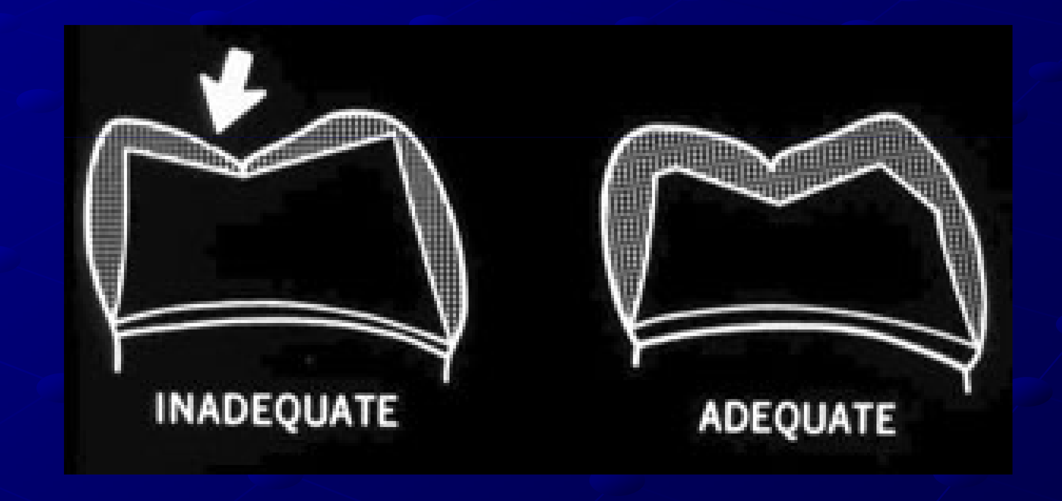


2-adequate tooth reduction

a- axial reduction

b-occlusal reduction

c- functional cusp bevel



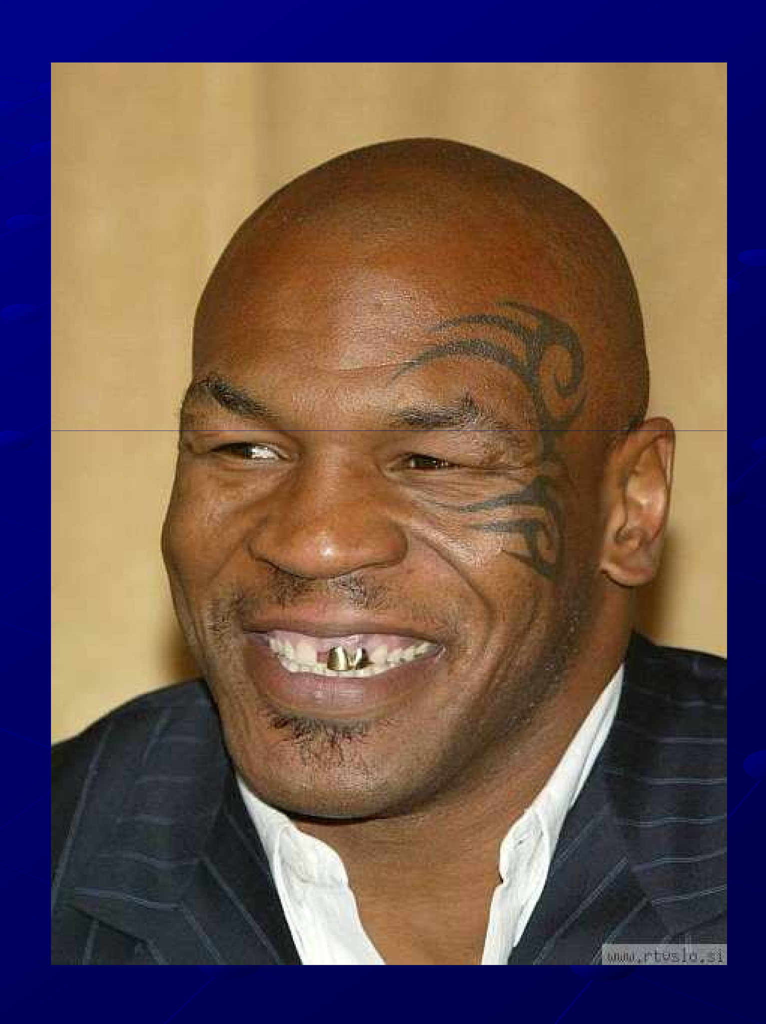
Esthetics considerations

1-Minmum metal display

2- Maximum thickness of porcelain

3-Porcelain on occlusal surface

4- Sub gingval margin



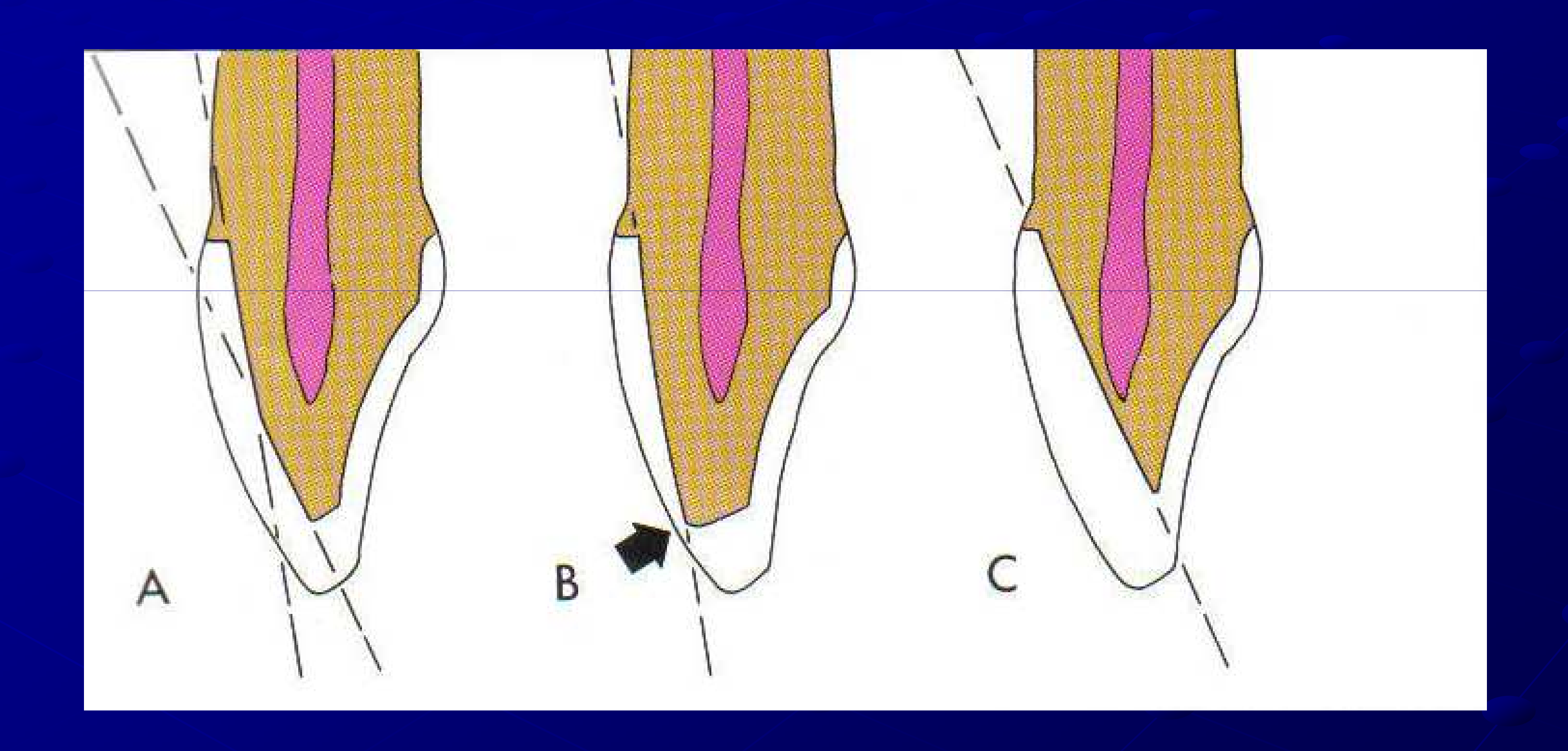
Important consideration

1- Operator skill

2- patient expectation



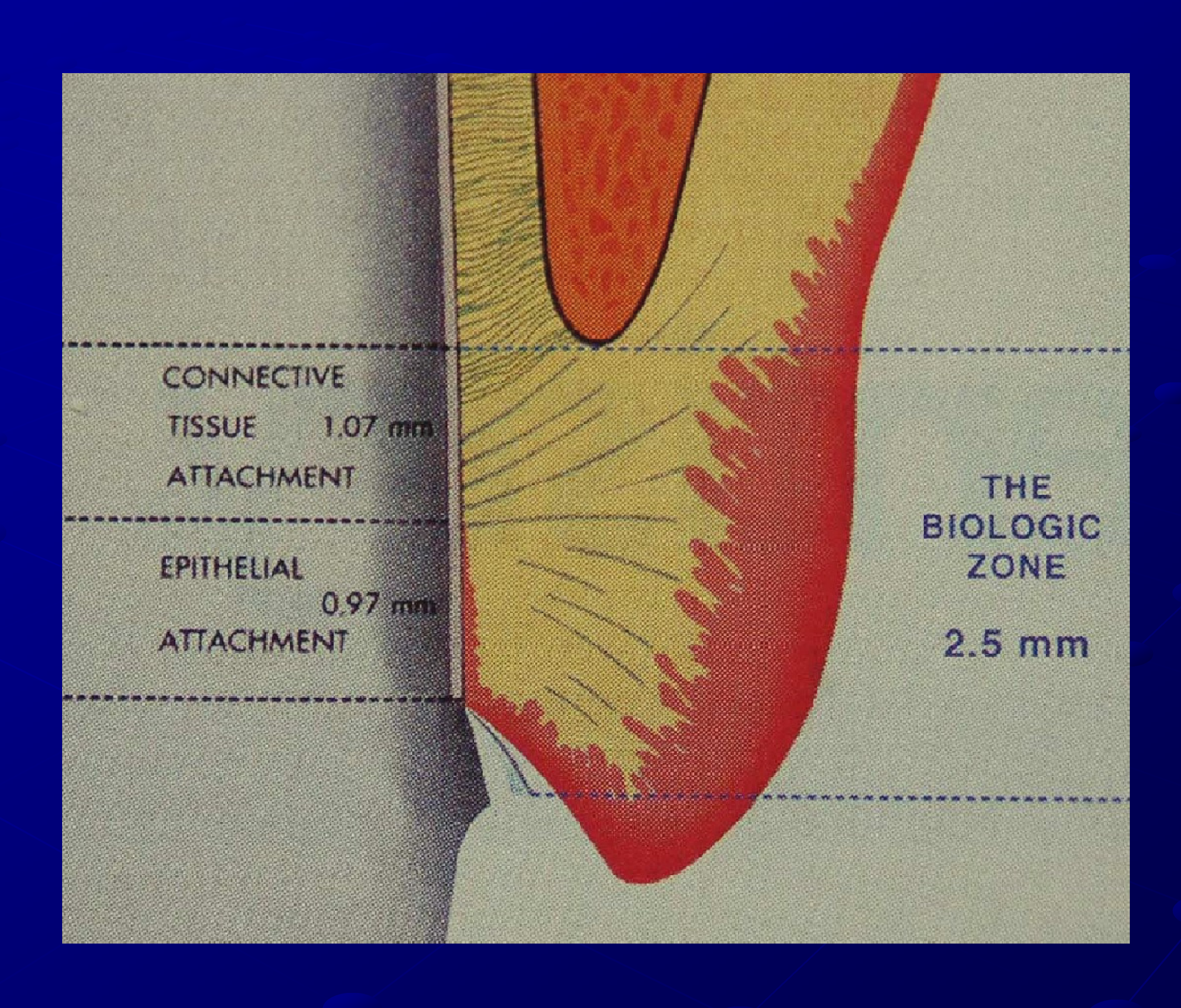
Complete coverage



Proper thickness of reduction



Subginval finish line



Partial coverage



How to get a good score in practical exam??

Steps

Understand the type of Margin for that particular Type of preparation.

Understand the type of Finish that the bur you are using will produce

Take your time and go Slow. As you become Competent, you can Increase your speed.

Make your preparation smooth and free of jagged edges.

Avoid sharp corners or edges

Follow the contour of the gingival in the mesial and distal areas

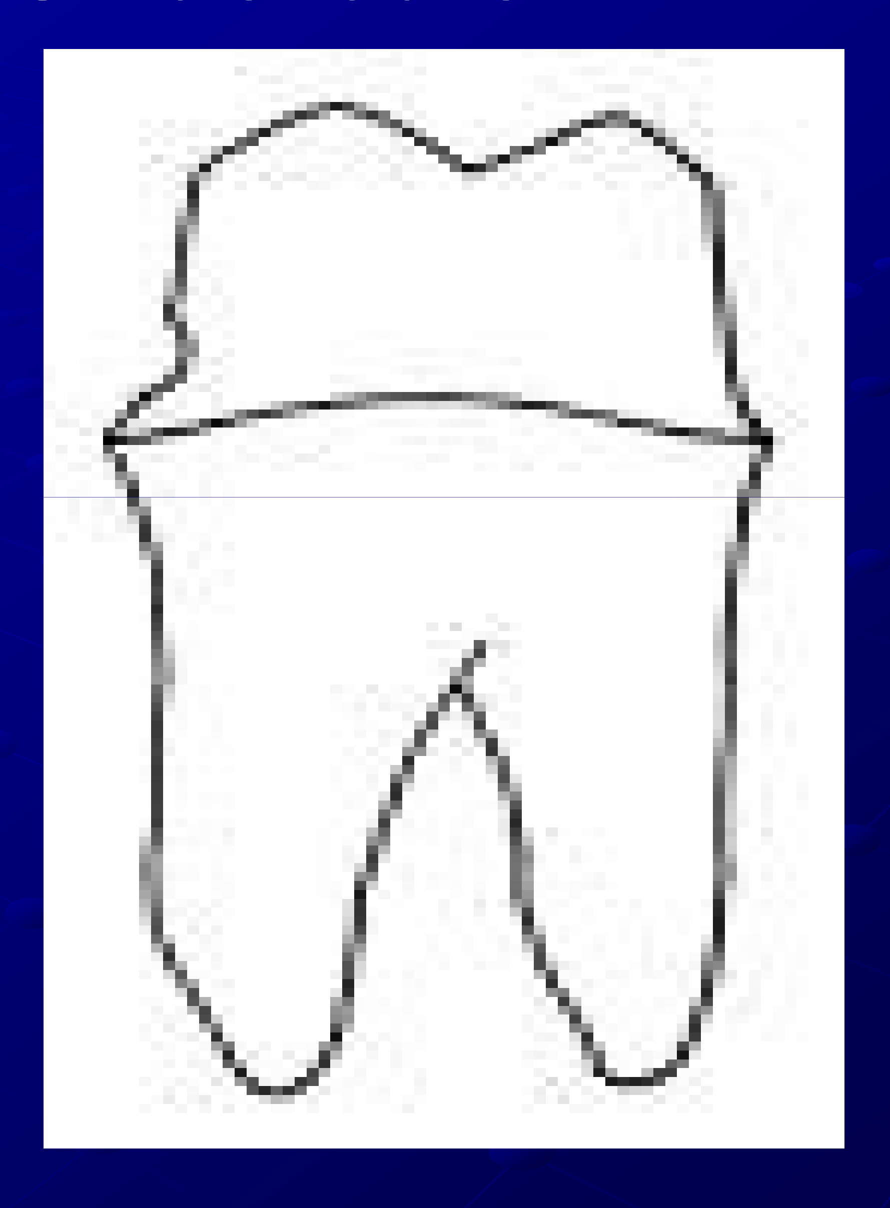
Avoid excessive taper.
Your prep should have a
Slight taper when viewed
Facial –Lingually

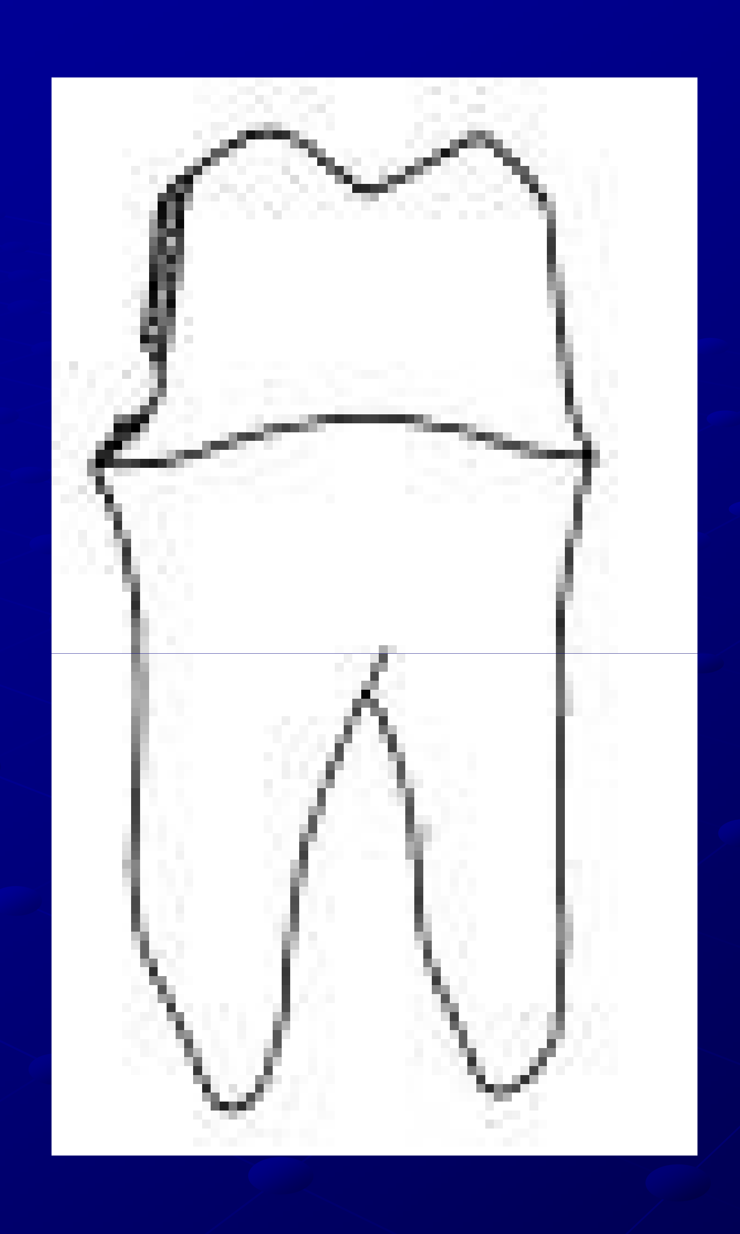


Common Errors

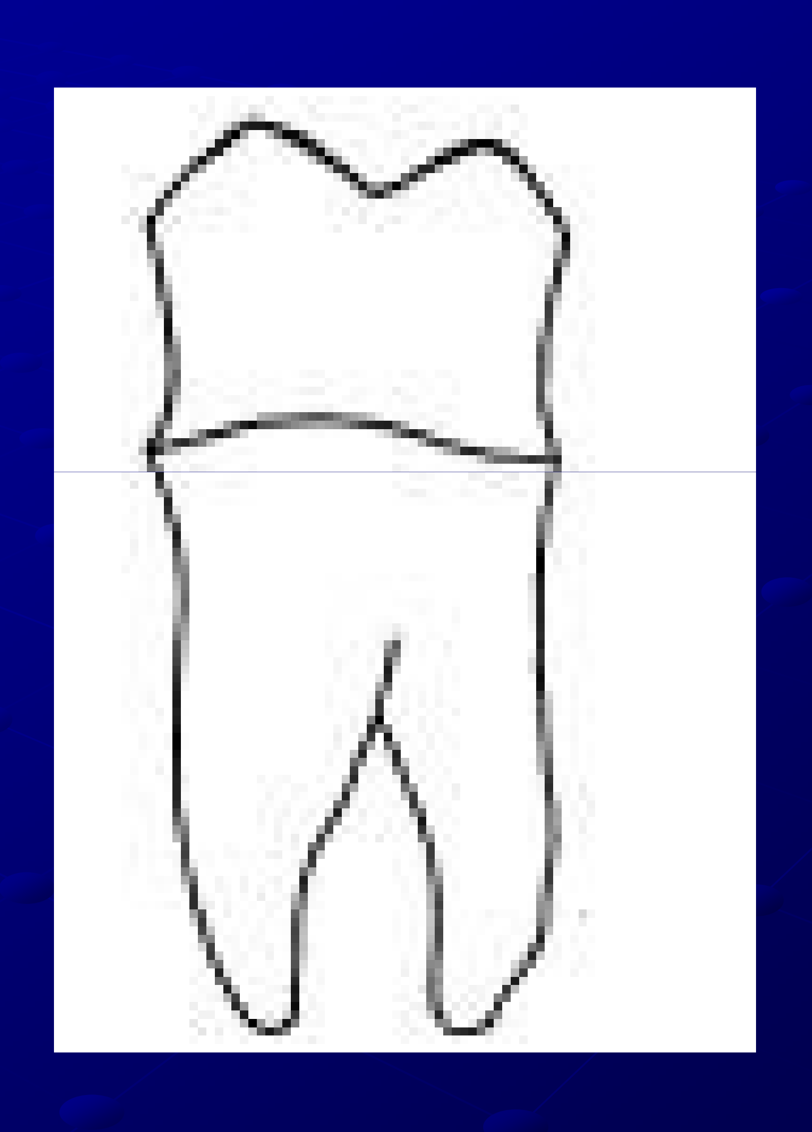


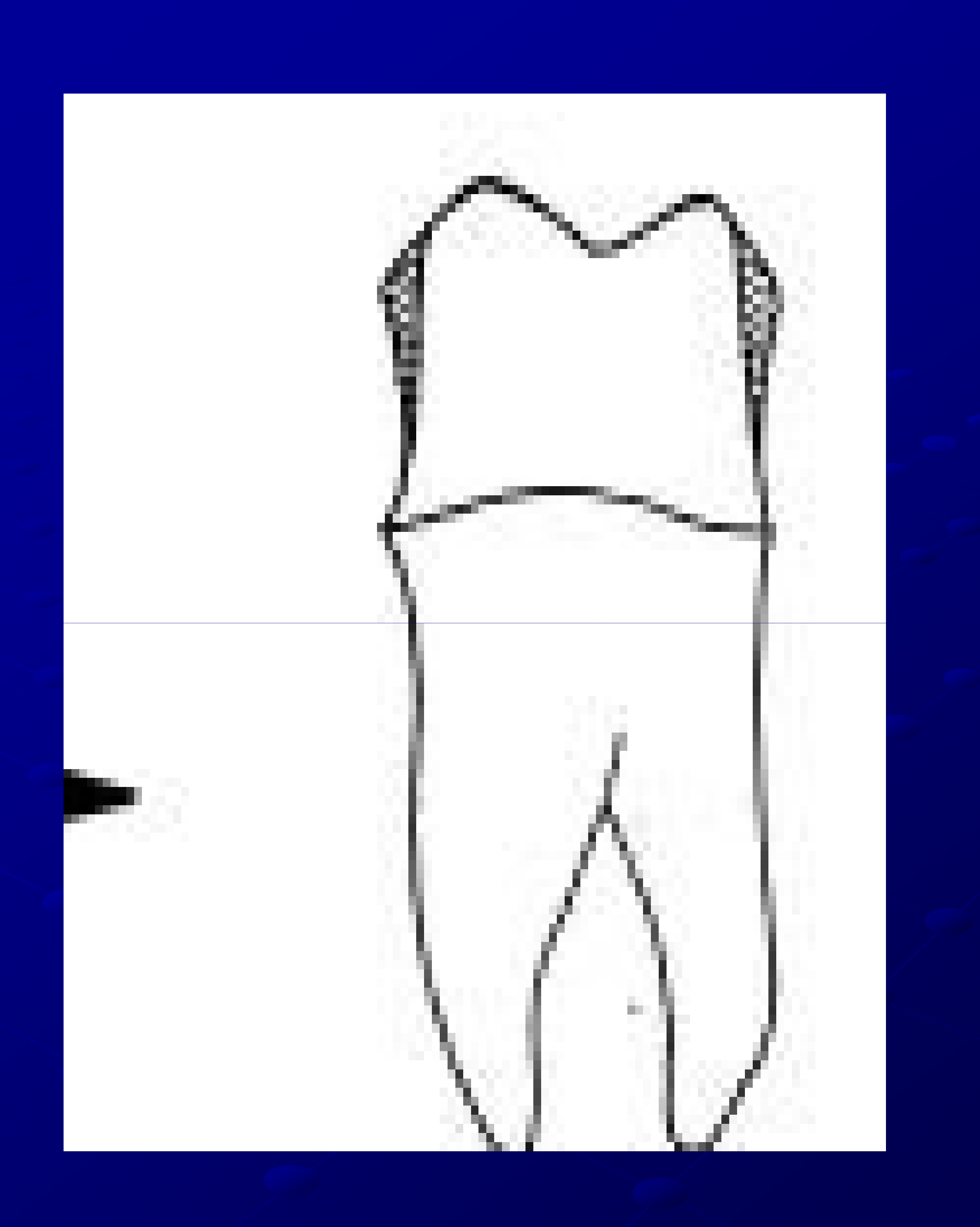
Undercuts





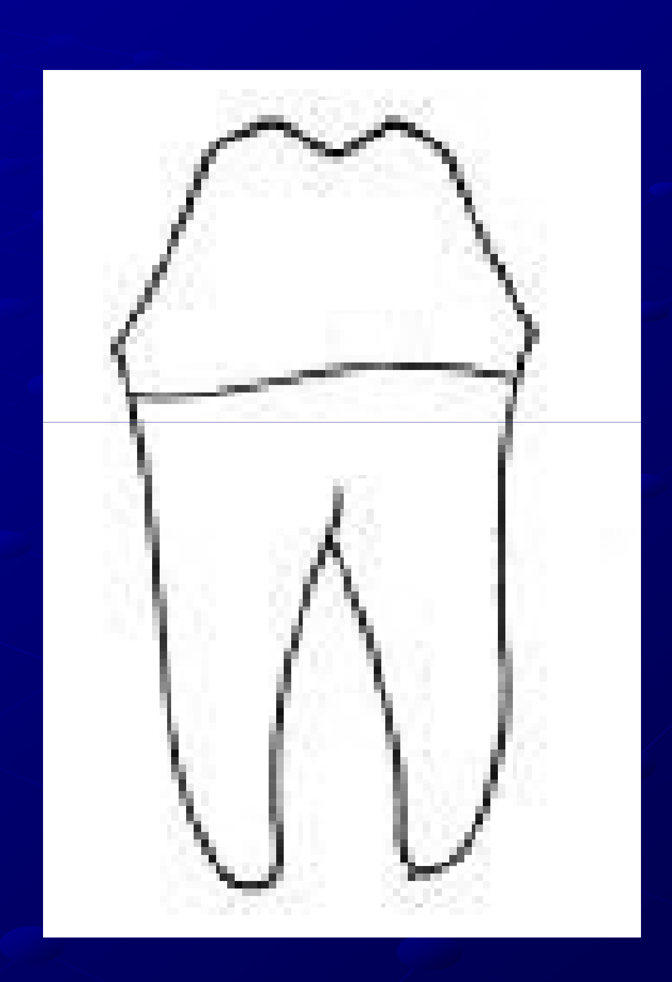
wall divergent

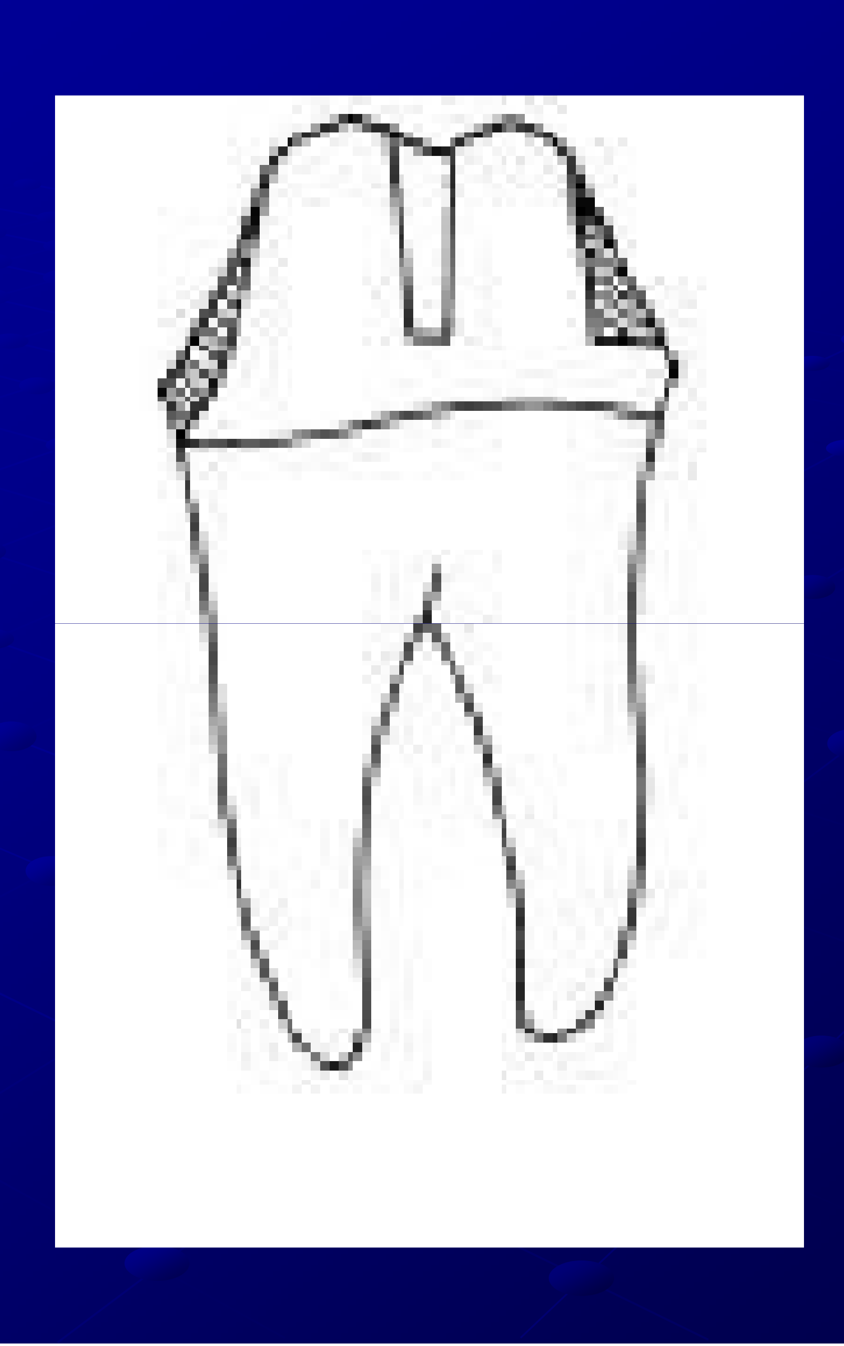


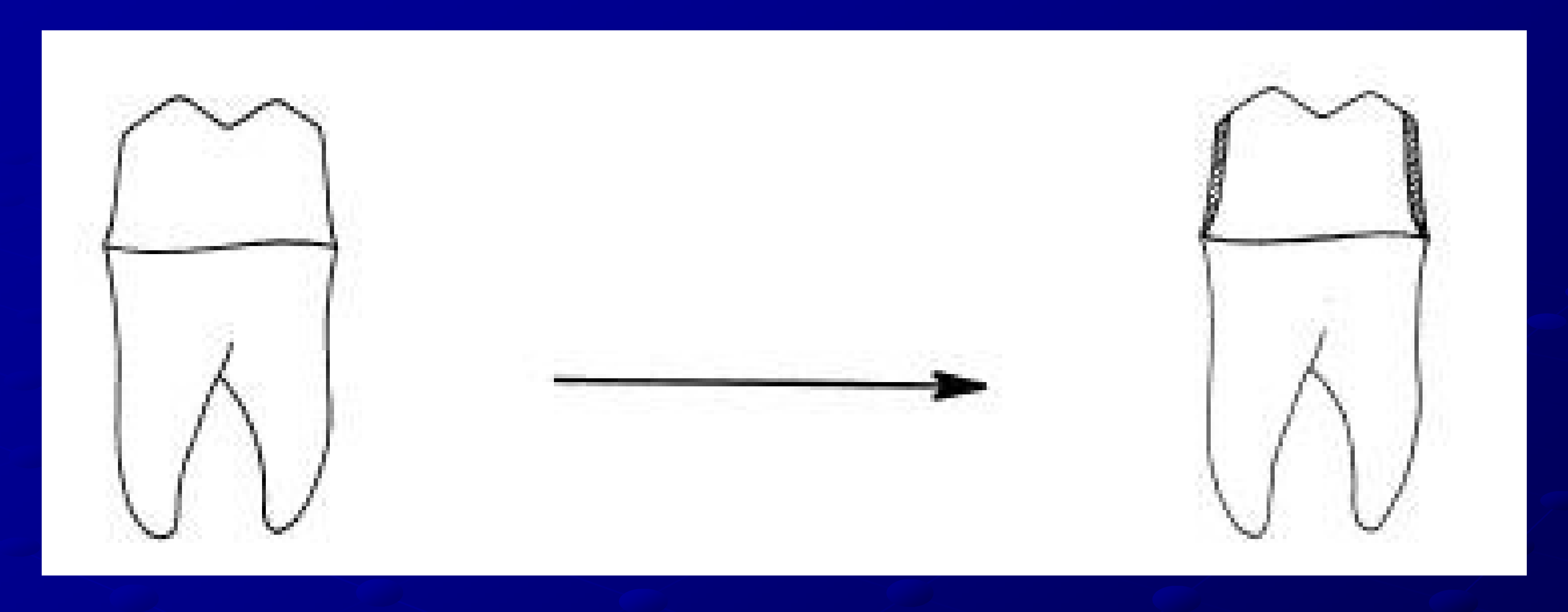


Over taper

- To much taper is unacceptable



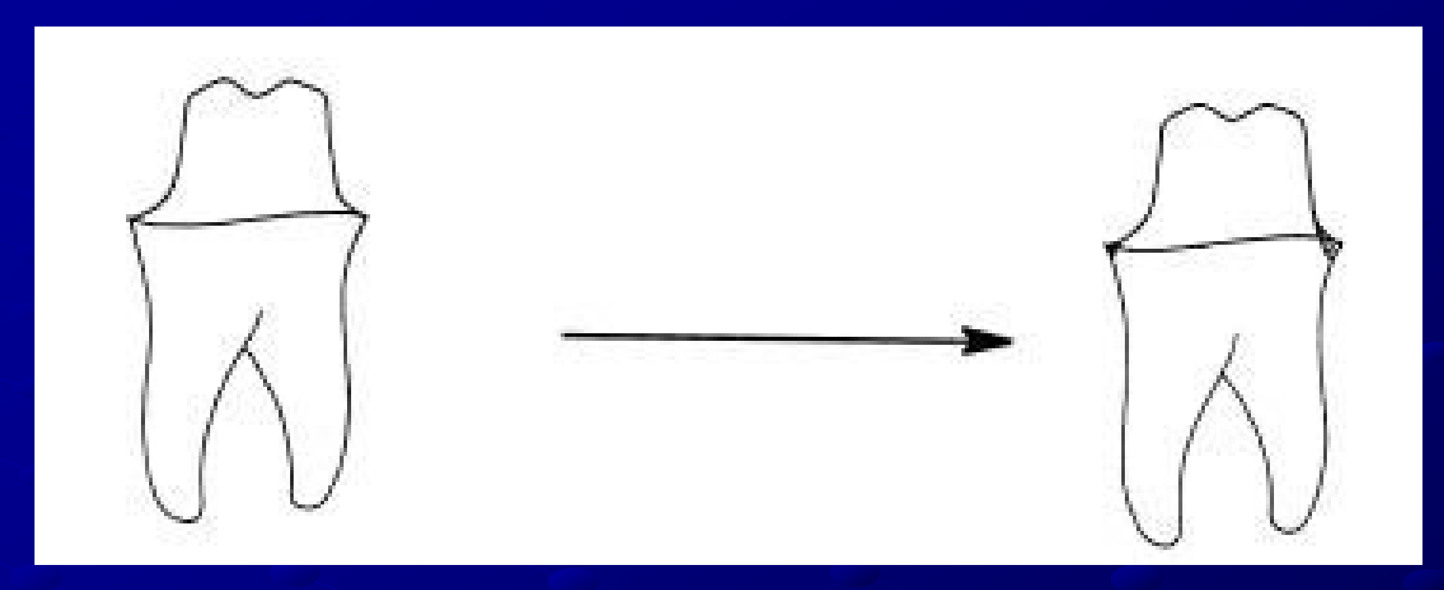




- finish line too light; walls are under-reduced

correction:

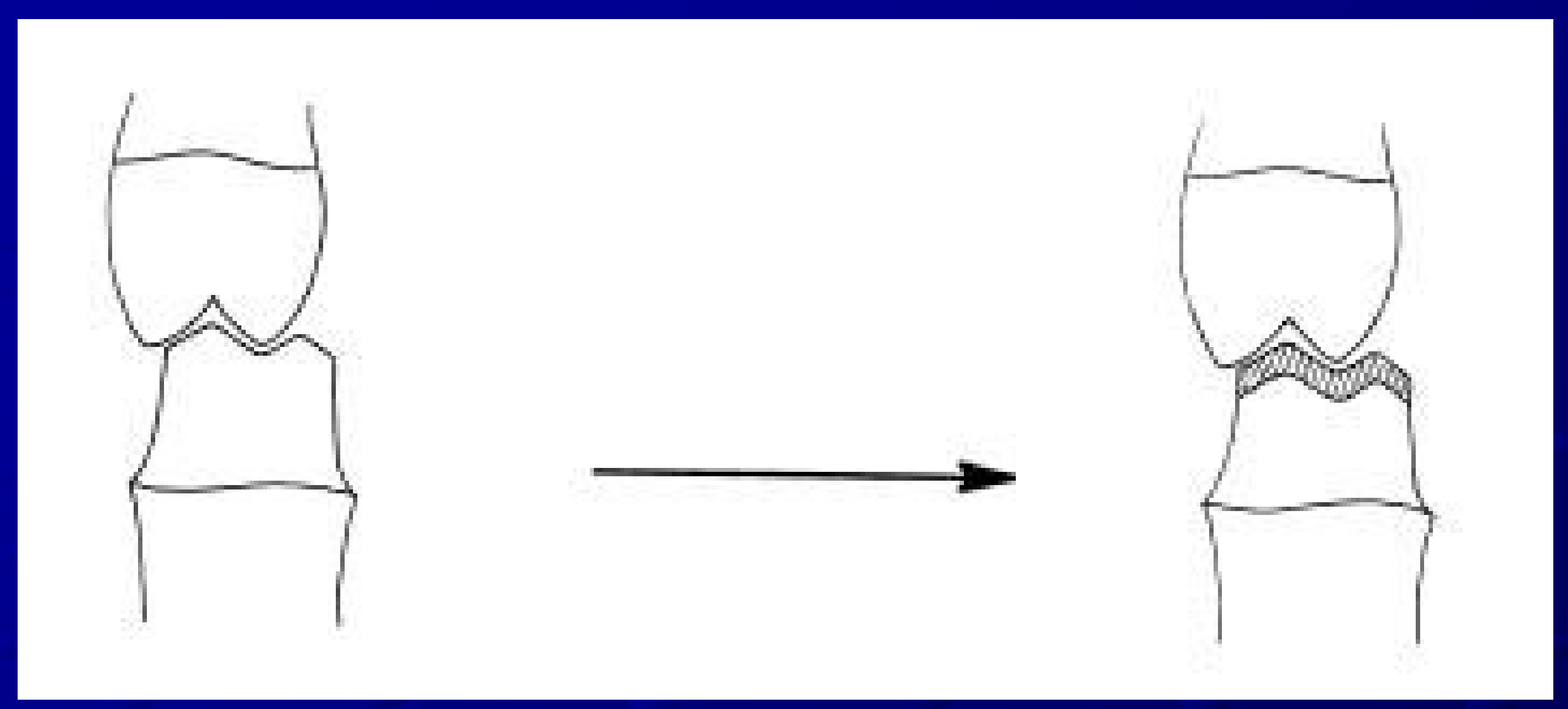
increase axial reduction



- finish line too heavy walls are over-reduced

correction:

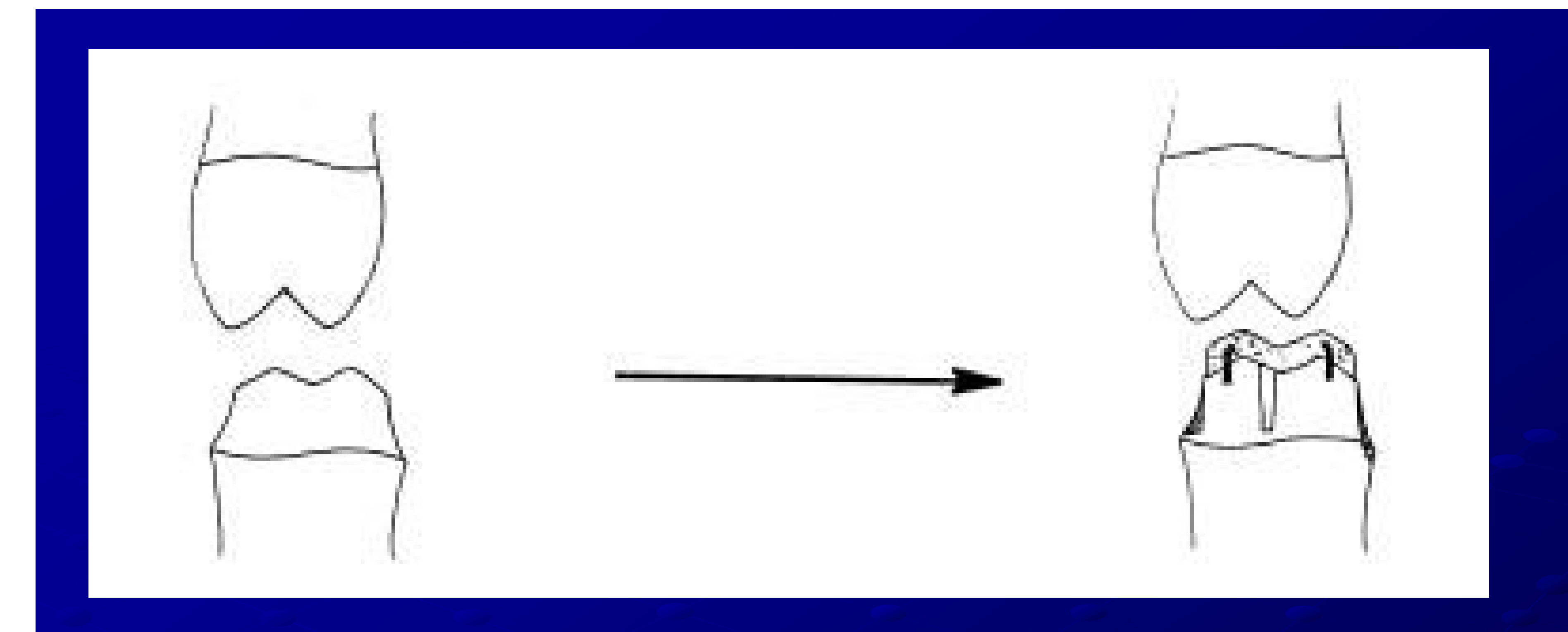
drop finish line to lighten it OR bevel finish line



- under-reduced occlusal surface -crown will be too thin

correction

increase reduction



- Over occlusal reduction
- Correction

  drop finish line to parallel walls **OR** create retentive grooves **OR** buildup occlusal surface with pin amalgam


ANY QUESTIONS?